Meeting Location: Corvallis, Oregon
USACE District: Seattle
TPP #1 Meeting Date: 4/5/06

Agenda (tentative)

(all times are Pacific Standard Time)

Wednesday, April 5, 2006

- **12:00 Noon Convene**
  - Location – Holiday Inn Express, 781 NE 2nd St, Corvallis, OR 97330
  - Introductions
  - Review Site Inspection Objectives
    - Goals, Objectives, Roles & Responsibilities
    - Site Inspection Process
    - Technical Project Planning (TPP) Process
- **1:00 PM TPP Discussion**
- **3:00 PM Summary/Concurrence**
- **3:45 PM Adjourn**
- **6:30 PM Convene Public Meeting**
  - Location – Santiam Christian School, 7220 NE Arnold Ave, Adair Village, OR 97330-9443; phone: (541) 745-5524
- **9:00 PM Adjourn Public Meeting**

Thursday, April 6

- **8:00 AM Optional windshield tour of Camp Adair FUDS—2 hrs**

Draft Technical Project Planning Memorandum

Site Inspection
Camp Adair/Adair Air Force Station
Formerly Used Defense Site
FUDS ID F10OR0029

Military Munitions Response Program

Documentation for Technical Project Planning Meeting
Holiday Inn Express, Corvallis, Oregon
April 5, 2006

Hosted by U.S. Army Corps of Engineers

Prepared by Shaw Environmental, Inc.

March 22, 2006

Concurrences

USACE Omaha Design Center/Omaha District	_____ John Miller
USACE Seattle District	_____ William Graney
Oregon Department of Environmental Quality	_____ Norm Read
Shaw Environmental, Inc.	_____ Peter Kelsall

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ABBREVIATIONS AND ACRONYMS

AOC	area of concern
ASR	Archives Search Report
bgs	below ground surface
CSM	Conceptual Site Model
CWM	chemical warfare materiel
DoD	Department of Defense
DQO	Data Quality Objective
FS	Feasibility Study
ºF	degrees Fahrenheit
FUDS	Formerly Used Defense Site
GPS	Global Positioning System
HRS	Hazard Ranking System
INPR	inventory project report
MC	munitions constituents
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MRSPP	Munitions Response Site Prioritization Protocol
NDAI	No Department of Defense Action Indicated
ODEQ	Oregon Department of Environmental Quality
OR	Oregon
RAC	Risk Assessment Code
RI	Remedial Investigation
Shaw	Shaw Environmental, Inc.
SHPO	State Historic Preservation Office
SI	Site Inspection
SSWP	Site-Specific Work Plan
TNT	trinitrotoluene
TPP	Technical Project Planning
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UXO	unexploded ordnance
Work Plan	*Type 1 Work Plan, Site Inspections at Multiple Sites*

Administrative Information

The Technical Project Planning (TPP) Memorandum is one in a series of documents used during the Site Inspection (SI) process to document the information collected and processes used to evaluate Formerly Used Defense Sites (FUDS) for the possible presence of munitions and explosives of concern (MEC) and/or munitions constituents (MC). TPP Meeting information provided in the Memorandum reflects both the original version of information shared with meeting participants, as well as changes/updates to site-specific information obtained during the TPP Meeting.

The TPP Meeting for the former Camp Adair/Adair Air Force Station (Camp Adair) will be conducted on April 5, 2006 at the Holiday Inn Express located in Corvallis, Oregon (OR). Representatives from the U.S. Army Corps of Engineers (USACE) – Omaha Design Center, the USACE Seattle District, Oregon Department of Environmental Quality (ODEQ), and Shaw Environmental, Inc. (Shaw) will be in attendance. A separate public meeting will be held in the evening at the Santiam Christian School, Adair Village, OR. An optional windshield site tour will be conducted on April 6, 2006.

The TPP Memorandum documents discussions for the TPP meeting and includes the sections described below:

- **Administrative Information:** includes meeting logistics and the list of attendees;
- **Site Inspection Objectives:** provides the goal and objectives of the SI, roles and responsibilities, the SI process, and the TPP process;
- **Background Information:** includes site and project history, area physical setting, a summary of previous environmental work, and an introduction to the areas of concern (AOC) addressed by the SI;
- **Conceptual Site Model (CSM):** used to identify environmental attributes, potential human and ecological receptors in the area's environment, and the relationships between these factors;
- **Proposed Sampling Scheme:** used to describe the type and quantity of samples to be taken, and the analytical methods to be used for characterizing the AOC;
- **TPP Notes and Data Quality Objectives (DQOs):** used to capture project and site-specific information as discussed during the TPP Meeting to ensure the necessary and appropriate information is shared among meeting participants, and that meeting participants concur with the identified goal, objectives, and approach used to complete the SI process; and
- **Worksheets:** includes the **Site Information Worksheet,** Draft **Munitions Response Site Prioritization Protocol** (MRSPP) **Data Gaps, and Hazard Ranking System** (HRS) **Data Gaps.**

Site Inspection Objectives

Goal

- The USACE is conducting SIs of FUDS properties to determine if any MEC or related MC are present on property formerly owned or leased by the U.S. Department of Defense (DoD).

Objectives

- Determine if the site requires further response action due to the presence of MEC/MC.
- Collect minimum information needed to:
    - Eliminate a site from further consideration if:
        - No evidence of MEC and/or
        - Concentrations of MC in samples are below risk-based action levels, or below background concentrations; or
    - Determine the potential need for removal action or initiation of the Remedial Investigation/Feasibility Study (RI/FS) if:
        - MEC identified and/or
        - Concentrations of MC in samples exceed risk-based action levels and background concentrations.
    - Provide sufficient data for the U.S. Environmental Protection Agency (USEPA) and the Army to prioritize future actions using the HRS and MRSPP.

Roles & Responsibilities

- **USACE:** Acts as the executing agency for the DoD with regard to the FUDS program. In this role, the USACE has decision making authority and is responsible for ensuring work is conducted in accordance with applicable USACE and federal guidance. Additionally, USACE coordinates and works with project team members to meet needs expressed by regulatory agencies and stakeholders.
- **Regulatory Agency:** Participates in planning of SI activities in order to meet applicable requirements and stakeholders expectations.
- **Property Owner(s)**: Provides available and pertinent information about the area, identifies current and anticipated future land uses for the property, and participates in project team discussions.
- **Shaw**: As a contractor to the USACE, conducts work on behalf of the USACE, provides TPP materials, makes site information available to the project team through a web-based information portal, and conducts and reports SI activities.

Site Inspection Process

- Data review,
- TPP,
- Site-Specific Work Plan (SSWP),
- SI field activities – reconnaissance, sampling, and analysis, and
- SI Report.

Technical Project Planning Process

- Conduct TPP meeting(s)* with key organizations and stakeholders;
- Identify stakeholder(s) concerns;
- Identify all AOCs for this SI;
- Review site information;
- Verify current and anticipated future land use;
- Develop CSM;
- Identify data gaps;
- Plan how to address data gaps;
- Develop DQOs for meeting SI requirements; and
- Concur on SI field work approach.

* 2nd TPP meeting to be determined by team members during the 1st TPP meeting.

Background Information

Site Description and Regulatory History

Background and historical information (including references to interviews and historical documents) contained in this package was obtained from the *Archives Search Report* (ASR) (USACE, 2001), the *ASR Supplement* (USACE, 2004), and the *Ground-Water Hydrology of the Willamette Basin* (Conlon et al., 2005).

Site Location

- The former Camp Adair/Adair Air Force Station (referred to in this document as Camp Adair except when specifically referring to non-Army use) is located approximately 9 miles north of Corvallis, Oregon, in Polk, Benton, and Linn Counties (Figure 1).
- Camp Adair occupied 56,815.17 acres of land, acquired from 1941 through March 1944.
- Camp Adair has 21 AOCs, including a variety of ranges and range complexes where small arms and/or explosive munitions were used, live hand grenade courts, practice grenade courts, and a chemical identification area (see Figures 3 through 17).

Physical Setting

- The landscape of the former camp is relatively flat to mountainous, variously vegetated with crops, grasses, shrubs, and trees.
- Current and expected future land use within the area of former Camp Adair include agriculture, private, state and national forest land, wildlife management and recreation areas, state and county parks, residences, and business. The Oregon National Guard maintains a rifle range.
- Monmouth and Adair Village are the nearest towns, with populations of approximately 7,700 and 500, respectively. Polk County has a population of approximately 62,000, Benton County has approximately 78,000, and Linn County has over 103,000.
- Camp Adair is in the Willamette Valley, with the Coast Range on the west and the Cascade Range on the east. The annual rainfall of the area averages 35-40 inches. Most of the precipitation occurs during November to March. In the immediate area, there are only 3 or 4 days a year with measurable amounts of snow. The mean average daily temperature is 61 degrees Fahrenheit (ºF) in the summer and 42 ºF in the winter.

Previous Investigations and Regulatory History

- In 1992, USACE completed an inventory project report (INPR) for Camp Adair, identifying a potential hazard from ordnance at the FUDS.
- USACE issued an ASR in 2001, which compiled available information for Camp Adair with emphasis on types, quantities, and areas of ordnance use and disposal.
- An ASR Supplement, completed in 2004, identified specific AOCs.
- A Risk Assessment Code (RAC) scoring was conducted by USACE in 2004. Possible scores range from 5 (no risk) to 1 (high risk). The following table summarizes the RAC

determinations for the AOCs and indications of whether MEC has been found at these AOCs since the end of Army training:

AOC	RAC Score	MEC Found
Skeet Range No. 580	5	No
Practice Grenade Court No. 122	4	No
Practice Grenade Court No. 120	4	No
Practice Grenade Court No. 121	4	No
Infiltration Range No. 143	2	No
Chemical Identification Area No. 182	1	No
Practice Grenade Court No. 127	4	No
Practice Grenade Court No. 125	4	No
Practice Grenade Court No. 126	4	No
East Live Hand Grenade Court	3	Yes
Live Hand Grenade Court No. 129	3	Yes
West Live Hand Grenade Court	3	No
Bombing Target No. 1	3	No
Mortar Range	2	Yes
Moving Target Range No. 75	3	Yes
Range Complex No. 1	2	Yes
Range Complex No. 2	1	Yes
Range Complex No. 3	3	No
Range Complex No. 4	5	No
Range Complex No. 5	5	No
Range Complex No. 6	5	No

Operational History and MEC/MC Characteristics

Historic Military Operations

- Camp Adair was used for training of triangular (three-regiment) infantry divisions between 1942 and 1945. Training activities for four army infantry divisions included use of small arms, explosives, mortars, artillery, antiaircraft and antitank guns, and support by tanks and Army Air Forces aircraft.
- Other uses of the camp from 1944 to 1946 included bombing and gunnery practice for Navy/Marine pilots, a storage facility, a prisoner of war camp, and a Navy hospital.

- Camp Adair included a cantonment area east of Highway 99 and a live fire and maneuver area to the west.
- During the last 2 years of training, an estimated 265,000 rounds of high explosive ammunition (37 mm or larger) were fired.
- Camp Adair was declared surplus and assigned for disposition in April 1946.
- A War Department letter of August 1946 stated that Camp Adair had been "dedudded" so as to make it reasonably safe for any use. A Certificate of Clearance was issued in March 1947.
- After several years of inactivity the cantonment area was used as Adair Air Force Station between 1958 and 1969. Related munitions training activity was limited to use of Skeet Range No. 580 in the cantonment area (between 1955 and 1964).
- In 1970, the Adair Air Force Station lands were determined excess and reported to the General Services Administration for disposal.
- The Oregon National Guard has used a former Army range, the Known Distance Rifle Range No. 4, over the period from 1946 to the present. This is part of a 527-acre facility in which the National Guard conducts weapons qualification and field exercises.
- Over the years (and as recently as 2001), unexploded ordnance (UXO) has been found at the former Camp Adair, including 2.36-inch anti-tank rockets, and 60 mm, 81 mm, 105 mm, and 155 mm rounds. Locations of some of these UXO finds are plotted on Figure 1.

MEC/MC Characteristics

- The MEC/MC used at the AOCs and land use controls are delineated in Table 1.
- MEC finds within the AOCs are shown on Figures 3 through 17.

Groundwater

- The site is located in the Oregon Coast Range section of the Pacific Border physiographic province.
- Soils at the site are silty, sandy clays with varying gravel content. Potential for soil erosion is severe in some areas. Potential frost depths extend to 24 inches.
- Bedrock consists of Tertiary submarine lavas and marine sediments. Alluvial deposits of silts and pebbly sands with lenses of gravel overlie bedrock in the valleys of the Luckiamute River and tributary streams.
- Shallowest groundwater within the site is generally within one of two hydrogeologic units: the basement confining unit (bedrock) in upland areas, characterized by low permeability, porosity, and well yield; and the Willamette silt unit, characterized by high porosity but low permeability and well yield, although it may be a significant source of recharge to underlying units (Conlon et al., 2005).
- In lowland areas, groundwater discharges to streams. During wet winter months, this may be a relatively small component of the total stream flow, but in dry summers groundwater is the main component of stream flow (Conlon et al., 2005).

- Domestic water supply wells located throughout the site (Figure 2) typically tap the basement confining unit (bedrock). Depths range from 50 feet or less to several hundred feet. In many cases, well records indicate that the well bores are uncased through most of the bedrock interval. Static water levels are generally from 10 to 40 feet below ground surface (bgs).

Surface Water

- The site is located within the Upper Willamette watershed and is drained in a generally eastern direction by tributaries of the Willamette River. The Luckiamute River, which is the largest surface water feature flowing through the area of the former Camp Adair, is characterized by relatively high flows in winter months (generally 500 to 2000 cubic feet per second), with low summer flows. A hydrogeologic map and cross sections of the area are shown on Figures A and B.
- Surface water and groundwater are the primary sources of water for various public water systems in the area. The Adair Village water system uses surface water; the Monmouth water system uses groundwater.

Terrestrial Exposure

- Residential areas are presently located within several of the AOCs.
- The following federally listed threatened or endangered species may occur on or near Camp Adair (USACE, 2001). The U.S. Fish and Wildlife Service will be contacted for an updated species list.

Endangered Species	**Threatened Species**
Oregon chub Fender's blue butterfly Willamette daisy Bradshaw's lomatium	Aleutian Canada goose Bald eagle Northern spotted owl Steelhead Chinook salmon Golden Indian paintbrush Howellia Kincaid's lupine Nelson's checkermallow

- The State Historical Preservation Office (SHPO) will be contacted to determine if historical or other cultural resources are present in the area.

Air

- The nearest populated areas are the town of Monmouth on the northeast side, and Adair Village within the southeast area of the former camp.
- No previous air sampling was performed at the site.

Conceptual Site Model

Overview

A site-specific CSM summarizes available site information and identifies relationships between exposure pathways and associated receptors. A CSM is used to determine the data types necessary to describe site conditions and quantify receptor exposure, and discusses the following information:

- Current and future land use;
- Potential contaminant sources (i.e., lead projectiles in an impact berm);
- Affected media;
- Governing fate and transport processes (e.g., surface water runoff and/or groundwater migration);
- Exposure media (i.e., media through which receptors could contact site-related contamination);
- Routes of exposure (e.g., inhalation, incidental ingestion, and dermal contact); and
- Potential human and/or representative ecological receptors at the exposure point. Receptors likely to be exposed to site contaminants are identified based on current and expected future land uses.

The CSM is evaluated for completeness and further developed as needed through TPP meetings. Based on similar historical use, MEC/MC, and environmental conditions, the following types of AOCs are identified within Camp Adair:

- Small Arms Ranges,
- Explosive Munitions Ranges,
- Live Hand Grenade Courts,
- Practice Grenade Courts, and
- Chemical Identification Area

CSMs are presented for these AOC groups. MEC and MC are analyzed individually within each CSM.

Conceptual Site Model – Small Arms Ranges

The small arms range AOCs (and sub-ranges within range complexes) at Camp Adair include:

- Infiltration Range No. 143 (Figure 10)
- Range Complex No. 4 (Figures 5, 5A, 5B)
    - Known Distance Rifle Range No. 1
    - Known Distance Rifle Range No. 2
    - Known Distance Rifle Range No. 3
    - Known Distance Rifle Range No. 4
    - Thompson Sub Machine Gun Range No. 50
    - Thompson Sub Machine Gun Range No. 50A
    - Mini A-A Range No. 60, 61, 62
    - Mini A-A Range No. 65, 66, 67
    - Anti Aircraft Range No. 70
    - Field Combat Range No. 80
    - Field Combat Range No. 80A
    - Field Combat Range No. 80B
    - Field Combat Range No. 81
    - Infiltration Range No. 141
    - Transition Course No. 160
    - Close Combat Course No. 170
- Range Complex No. 5 (Figure 6)
    - 1000-in Machine Gun Range No. 20, 21, 22, 23
    - 1000-in Anti-Tank Range No. 45, 46
    - 1000-in Anti-Tank Range No. 40, 41
    - 1000-in Pistol Range No. 15
    - 1000-in Landscape Range No. 35, 36, 37
- Range Complex No. 6 (Figure 7)
    - 1000-in Pistol Range No. 11
    - 1000-in Landscape Range 30, 31, 32
    - 1000-in Landscape Range No. 33
    - 1000-in Landscape Range No. 34
- Skeet Range No. 580 (Figure 17)

Current and Future Land Use

- A large portion of the small arms range AOCs are currently used for residential purposes.
- Other uses include a county park adjacent to residential areas (Skeet Range No. 580), landfill (Infiltration Range No. 143), state forest, and an active National Guard small arms range and maneuver area (portions of Range Complex No. 4).
- The active National Guard facility will not be included in this SI.

Former Range Use

- The ranges were used by the Army between 1942 and 1945, with the exception of the skeet range, which was used between 1955 and 1964 as part of the Adair Air Force Station Facility.
- Weapons used at these ranges were limited to small arms (.22 to .50 caliber).
- Known use of explosives at these ranges was limited to static charges of dynamite or trinitrotoluene (TNT) (detonated with blasting caps) in craters at Infiltration Range No. 141 (Range Complex No. 4) and Infiltration Range No. 143.
- At some ranges, small arms fire would tend to be concentrated in backstops; i.e., manmade berms or natural hillsides (Figure C). Berms are still evident at Known Distance Rifle Ranges No. 1 through 4 (Range Complex No. 4).
- At other ranges, small arms fire would tend to be dispersed over a wide area; e.g., the anti-aircraft ranges and the skeet range (Figure D).

MEC Evaluation

Types of MEC

- The munitions used at these AOCs was limited to small arms rounds, which do not pose a significant explosive hazard.
- Limited use of explosives (dynamite, TNT, and blasting caps) on two infiltration ranges was more highly controlled than typical use of explosive munitions. Static charges were detonated in craters within the courses to simulate combat conditions. The potential for unexploded ordnance to be present at these locations is low, although there is some potential for unknown explosive munitions.
- Based on the later, non-infantry use of the skeet range, this AOC is considered to pose no significant risk from MEC.

Surface Exposure Pathway

- Slight MEC risk is associated with potential for unknown use of explosive MEC at the infantry ranges.

Subsurface Exposure Pathway

- Slight MEC risk is associated with potential for unknown use of explosive MEC at the infantry ranges.

An analysis of the exposure pathways and receptors for MEC are provided in Table 2.

MC Evaluation

Types of MC

- The anticipated MC at the small arms ranges is lead from the munitions debris.
- A relatively small quantity of copper and antimony is present in military bullets. Because lead accounts for more than 96 percent of the bullet mass, analysis for lead alone will be adequate as an indicator of MC contamination.
- At the infiltration ranges, there is a slight probability of impact from explosives. One of these ranges, in the active National Guard facility, will not be included in the site inspection. At the Infiltration Range No. 143, if accessible for sampling, analysis will include explosive compounds. The significant risk from explosive MC is from the explosive charges; risk from blasting caps, which included explosive compounds and mercury, is negligible and will not be addressed.
- Perchlorate may have been present in tracer rounds where .50 caliber machine guns were used (Range Complexes No. 4 and 5).

Overview of Pathways

Affected media and potential pathways for MC include:

- Soil: Soil is the primary medium of concern because of possible MC in the soil from training activities. The soil also serves as a source of potential air, surface water, or groundwater contamination.
- Surface Water/Sediment: Surface water may act as a migration pathway from potential sources of contamination in soil. Accumulation of lead and explosives may occur in sediment along surface water migration pathways. Sediment will be the primary sample medium to assess surface water pathways.
- Groundwater: Groundwater is considered a potentially affected media because it is generally present within 40 feet of ground surface. Groundwater may also serve as a migration path to downgradient surface water.
- Air: Inhalation of MC in vapor form is not a pathway of concern for non-volatile MC under normal environmental conditions. Potential inhalation of soil particles is included in the development of health-based screening values for soil.

Potential exposure media at the small arms ranges include soil, surface water/sediment, and groundwater. A pathway evaluation for these media is discussed below and provided in Table 2.

Soil Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated soils include incidental ingestion of and dermal contact with contaminated media, as well as inhalation of soil particulates during intrusive work.

- The potential routes of pets, livestock, and wildlife exposure to contaminated soils include ingestion of and direct contact with contaminated media. Plants may uptake MC and then subsequently be eaten by livestock and wildlife. Burrowing animals may ingest MC-contaminated soil and subsequently be eaten by predators.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Pets, livestock, and wildlife.

Evaluation/Investigation Needed

- Soil samples to be collected at locations within the AOCs (primarily impact areas).
- Samples to be analyzed for lead (also explosives in Infiltration Range No. 143 course area).

Surface Water/Sediment Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated surface water and sediment include ingestion, dermal contact, and inhalation.
- The potential routes of pets, livestock, and wildlife (including aquatic organisms) exposure to contaminated surface water include ingestion and direct contact.

Receptors

- Residents.
- Workers (Farmers, foresters, etc).
- Recreational users.
- Pets, livestock, and wildlife.

Evaluation/Investigation Needed

- Sampling of potential source soils provides information regarding potential impact to surface water pathways.
- One sediment sample will be collected at the largest small arms range complex, where range activity indicates less concentrated accumulation of lead from bullets may be expected.
- Sample to be analyzed for lead.

Groundwater Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated groundwater include ingestion, dermal contact, and inhalation where groundwater is used as a water supply.

- Direct exposure of wildlife to groundwater is not a concern. The potential routes of pets or livestock exposure include ingestion, dermal contact, and inhalation where groundwater is used as a water supply.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Pets or livestock.

Evaluation/Investigation Needed

- Groundwater samples at or near some of the major ranges will be collected from existing wells—specific locations to be determined.

- To the extent practicable, well selection will favor the following criteria: location within or near a potential source area, wells open or unsealed within 30 feet of ground surface, total depth of 100 feet or less, and wells listed in the USGS monitoring database.

- One groundwater sample will be collected in the vicinity of each of the three small arms range complexes. The samples will be analyzed for lead (also perchlorate at Range Complexes 4 and 5 where a potential perchlorate source is indicated by use of .50 caliber machine guns).

Conceptual Site Model – Explosive Munitions Ranges

The explosive munitions range AOCs (and sub-ranges within range complexes) at Camp Adair include:

- Range Complex No. 1 (Figures 3, 3A through 3D)
    - Fortified Training Area No. 76
    - Bombing Target No. 2
- Range Complex No. 2 (Figures 3, 3A through 3D)
    - Field Combat Range No. 51
    - Moving Target Range No. 79A
    - Moving Target Range No. 79B
    - Field Combat Range No. 83
    - Field Combat Range No. 84
    - Field Combat Range No. 84A
    - Field Combat Range No. 85
    - Field Combat Range No. 86
    - Field Combat Range No. 86A
    - Field Combat Range No. 87
    - Field Combat Range No. 87A
    - Field Combat Range No. 87B
    - Field Combat Range No. 88
    - Field Combat Range No. 89B
    - Mortar Range No. 90
    - Infiltration Range No. 142
- Bombing Target No. 1 (Figure 3, 3A through 3D)
- Range Complex No. 3 (Figure 4)
    - Field Combat Range No. 89
    - Field Combat Range No. 89A
    - Field Combat Range No. 89C
- Mortar Range (Figure 15)
- Moving Target Range No. 75 (Figure 16)

Current and Future Land Use

- A large portion of the explosive munitions range AOCs are located in the north half of the FUDS on private land. Land use is largely agricultural and forestry related, with a relatively low but significant number of residences.
- Two ranges in the south half of the FUDS are principally located on state forest land.

Former Range Use

- The ranges were used by the Army between 1942 and 1945.
- Navy and Marine Corps pilots also conducted bombing and gunnery operations in the north area of the FUDS sometimes referred to as the artillery range (principally Range Complexes No. 1 and 2 and Bombing Target No. 1).
- Munitions used varied from range to range but at Range Complexes No. 1 and 2 all infantry and crew-served conventional weapons were authorized for use. Weapons used included the .30 caliber rifle, automatic rifle, .30 caliber light and heavy machine guns, .50 caliber machine gun, anti-tank guns, 105 mm and 155 mm howitzers, mortars, and 2.36-inch anti-tank and practice rockets.
- Exercises included support by tank and aircraft (the latter using 100-pound, 300-pound, and 500-pound general-purpose and practice bombs).
- Explosives, blasting caps, and incendiary, illumination, and smoke devices were also used.
- The range complexes included many overlapping safety fans and supported multiple activities that simulated combat conditions (Figure E).
- Much of the explosive munitions fire was directed toward specific targets, creating impact areas. A 1947 Certificate of Clearance included a recommendation that three land tracts be restricted to grazing or timbering activity due to a high concentration of shell firing (i.e., the “Impact Areas” of Figure 3).
- Craters caused by explosive munitions were visible during and shortly after the use of these ranges, but these areas have generally been regraded for agricultural or other purposes.

MEC Evaluation

Types of MEC

- The munitions used in Range Complexes No. 1 and 2 included the full range of infantry munitions described above.
- Munitions at Range Complex No. 3 included general small arms, .50 caliber machine gun, large caliber high explosive projectiles (105 mm HE M1, 155 mm HE M107, 37 mm HE M54, 57 mm APC-T M86, and mortars (60 mm HE M49, 81 mm HE M43, 60 mm practice M50A2, 81 mm TP M43A1).

- Munitions at the Mortar Range included general small arms and mortars (60 mm HE M49, 81 mm HE M43, 60 mm Training M69, 60 mm Training M50A2, 81 mm Training M68, and 81 mm Training M43A1).
- Munitions at the Moving Target Range No. 75 included large caliber projectiles (75 mm HE M48, 37 mm AP M74).
- The ASR and/or ASR Supplement indicate that MEC ("duds") have been found at the following explosive munitions ranges (locations of reported MEC finds are plotted on the figures of each AOC):
    - Range Complex No. 1
    - Range Complex No. 2
    - Mortar Range
    - Moving Target Range No. 75
- The potential hazard from MEC is significant, as indicated by reported encounters of explosive MEC since the late 1940's and as recently as 2001.

Surface Exposure Pathway

- The potential route of human exposure to MEC or munitions debris includes direct contact by vehicles, foot traffic, or handling. Human exposure would potentially include residents, workers, and recreational users.
- The potential route of livestock and wildlife exposure to MEC or munitions debris would be by direct contact.

Subsurface Exposure Pathway

- The potential routes of human exposure to MEC or munitions debris would be through intrusive activity or geologic instability (erosion, freeze-thaw, etc.).
- The potential route of livestock and wildlife exposure to MEC or munitions debris would be by burrowing activities or geologic instability.

An analysis of the exposure pathways and receptors for MEC are provided in Table 2.

MC Evaluation

Types of MC

- The anticipated MC at the explosive munitions ranges is primarily residual explosive compounds from munitions that underwent high-order (normal) or low-order detonation, or from undetonated munitions.
- To a lesser degree, there is a potential for the presence of elevated concentrations of metals. Sources would primarily include the metallic content of the projectiles and other munitions components. Small quantities of metals were also used in tracers, incendiary mixtures, and in primary explosives.

- Perchlorate may have been present as a component of some munitions, i.e., in tracer rounds where .50 caliber machine guns were used (Range Complexes No. 1, 2, and 3, and Mortar Range).

Overview of Pathways

Affected media and potential pathways for MC include:

- Soil: Soil is the primary medium of concern because of possible MC in the soil from training activities. The soil also serves as a source of potential air, surface water, or groundwater contamination.
- Surface Water/Sediment: Surface water may act as a migration pathway from potential sources of contamination in soil. Accumulation of explosives and metals may occur in sediment along surface water migration pathways. Sediment will be the primary sample medium to assess surface water pathways.
- Groundwater: Groundwater is considered a potentially affected media because it is generally present within 40 feet of ground surface. Groundwater may also serve as a migration path to downgradient surface water.
- Air: Inhalation of MC in vapor form is not a pathway of concern for non-volatile MC under normal environmental conditions. Potential inhalation of soil particles is included in the development of health-based screening values for soil.

Potential exposure media at the explosive munitions ranges include soil, surface water/sediment, and groundwater. A pathway evaluation for these media is discussed below and provided in Table 2.

Soil Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated soils include incidental ingestion of and dermal contact with contaminated media, as well as inhalation of soil particulates during intrusive work.
- The potential routes of livestock and wildlife exposure to contaminated soils include ingestion of and direct contact with contaminated media. Plants may uptake MC and then subsequently be eaten by livestock and wildlife. Burrowing animals may ingest MC-contaminated soil and subsequently be eaten by predators.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Livestock and wildlife.

Evaluation/Investigation Needed

- Soil samples to be collected at locations within the AOCs (1 to 7 samples per AOC, primarily at impact areas).

- Samples to be analyzed for explosives and selected metals.
- Metals for analysis: aluminum, barium, iron, lead, magnesium, and strontium.

Surface Water/Sediment Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated surface water and sediment include ingestion, dermal contact, and inhalation of water.
- The potential routes of livestock and wildlife (including aquatic organisms) exposure to contaminated surface water include ingestion and direct contact.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Livestock and wildlife.

Evaluation/Investigation Needed

- Sampling of potential source soils provides information regarding potential impact to surface water pathways.
- Sediment samples will be collected at locations within or downslope of the AOCs (1 to 2 samples per AOC).
- Samples to be analyzed for explosives and selected metals.
- Metals for analysis: aluminum, barium, iron, lead, magnesium, and strontium.

Groundwater Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated groundwater include ingestion, dermal contact, and inhalation where groundwater is used as a water supply.
- Direct exposure of wildlife to groundwater is not a concern. The potential routes of livestock exposure include ingestion, dermal contact, and inhalation where groundwater is used as a water supply.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Livestock.

Evaluation/Investigation Needed

- One groundwater sample will be collected at each AOC (two samples at Range Complex No. 2).
- To the extent practicable, well selection will favor the following criteria: location within or near a potential source area, wells open or unsealed within 30 feet of ground surface, total depth of 100 feet or less, and wells listed in the USGS monitoring database.
- Samples to be analyzed for explosives, selected dissolved metals, and perchlorate.
- Metals for analysis: aluminum, barium, iron, lead, magnesium, and strontium.

Conceptual Site Model – Live Hand Grenade Courts

The live hand grenade court AOCs at Camp Adair include:

- East Live Hand Grenade Courts (Figure 12)
- West Live Hand Grenade Courts (Figure 13)
- Live Hand Grenade Court No. 129 (Figure 14)

Current and Future Land Use

- These AOCs are currently used for agriculture and tree farming.
- Agricultural buildings and/or residences are located near each AOC.

Former Range Use

- The ranges were used by the Army between 1942 and 1945.
- The courts were used for training in the use of live (explosive) and/or training hand grenades.
- Grenades were thrown from individual throwing bays constructed from sandbags or concrete, or from a trench.
- Grenades were thrown toward targets in an impact area approximately 25 yards from the throwing line (see Figure F).
- A danger area of approximately 600 feet would have been established around each court.

MEC Evaluation

Types of MEC

- The munitions used included the Mk II fragmentation hand grenade.
- M21 Practice grenades, which contained only small spotting charges of black powder, may also have been used.
- The potential hazard from MEC is significant, as indicated by reported encounters with hand grenades by local residents in the vicinity of at least two of the courts.

Surface Exposure Pathway

- The potential route of human exposure to MEC or munitions debris includes direct contact by vehicles, foot traffic, or handling. Human exposure would potentially include residents, workers, and recreational users.
- The potential route of livestock and wildlife exposure to MEC or munitions debris would be by direct contact.

Subsurface Exposure Pathway

- The potential routes of human exposure to MEC or munitions debris would be through intrusive activity or geologic instability (erosion, freeze-thaw, etc.).

- The potential route of livestock and wildlife exposure to MEC or munitions debris would be by burrowing activities or geologic instability.

An analysis of the exposure pathways and receptors for MEC are provided in Table 2.

MC Evaluation

Types of MC

- The anticipated MC at the explosive munitions ranges is primarily residual explosive compounds from grenades that underwent high-order (normal) or low-order detonation, or from undetonated munitions. The explosive charges used in the Mk II grenades were 2 ounces of TNT (or E.C. blank smokeless powder, consisting largely of nitrocellulose, in older models).
- To a lesser degree, there is a potential for the presence of elevated concentrations of metals from the grenade housing and components.

Overview of Pathways

Affected media and potential pathways for MC include:

- Soil: Soil is the primary medium of concern because of possible MC in the soil from training activities. The soil also serves as a source of potential air, surface water, or groundwater contamination.
- Surface Water/Sediment: Surface water may act as a migration pathway from potential sources of contamination in soil. Accumulation of explosives and metals may occur in sediment along surface water migration pathways.
- Groundwater: Groundwater is considered a potentially affected media because it is generally present within 40 feet of ground surface. Groundwater may also serve as a migration path to downgradient surface water.
- Air: Inhalation of MC in vapor form is not a pathway of concern for non-volatile MC under normal environmental conditions. Potential inhalation of soil particles is included in the development of health-based screening values for soil.

Potential exposure media at the explosive munitions ranges include soil, surface water/sediment, and groundwater. A pathway evaluation for these media is discussed below and provided in Table 2.

Soil Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated soils include incidental ingestion of and dermal contact with contaminated media, as well as inhalation of soil particulates during intrusive work.
- The potential routes of livestock and wildlife exposure to contaminated soils include ingestion of and direct contact with contaminated media. Plants may uptake MC and then subsequently be eaten by livestock and wildlife. Burrowing animals may ingest MC-contaminated soil and subsequently be eaten by predators.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Livestock and wildlife.

Evaluation/Investigation Needed

- One soil sample will be collected from each AOC.
- Samples to be analyzed for explosives and selected metals.
- Metals for analysis: aluminum, barium, iron, lead, magnesium, and strontium.

Surface Water/Sediment Exposure Pathway

Exposure Routes

- The relatively flat location of these AOCs would tend to limit the mobility of MC from the grenade court areas via the surface water/sediment pathway.
- The potential routes of human exposure to contaminated surface water and sediment include ingestion, dermal contact, and inhalation.
- The potential routes of livestock and wildlife (including aquatic organisms) exposure to contaminated surface water include ingestion and direct contact.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Livestock and wildlife.

Evaluation/Investigation Needed

- Sampling of potential source soils to provide information regarding potential impact to surface water pathways. Direct sampling of surface water or sediment is not planned.

Groundwater Exposure Pathway

Exposure Routes

- The potential routes of human exposure to contaminated groundwater include ingestion, dermal contact, and inhalation where groundwater is used as a water supply.
- Direct exposure of wildlife to groundwater is not a concern. The potential routes of livestock exposure include ingestion, dermal contact, and inhalation where groundwater is used as a water supply.

Receptors

- Residents.
- Workers (farmers, foresters, etc).
- Recreational users.
- Livestock.

Evaluation/Investigation Needed

- A groundwater sample will be collected from a well located near one of the three grenade courts.
- To the extent practicable, well selection will favor the following criteria: location within or near a potential source area, wells open or unsealed within 30 feet of ground surface, total depth of 100 feet or less, and wells listed in the USGS monitoring database.
- Samples to be analyzed for explosives and selected metals.
- Metals for analysis: aluminum, barium, iron, lead, magnesium, and strontium.

Conceptual Site Model – Practice Grenade Courts

The practice grenade court AOCs at Camp Adair include:

- Practice Grenade Court No. 120 (Figure 8)
- Practice Grenade Court No. 121 (Figure 8)
- Practice Grenade Court No. 122 (Figure 8)
- Practice Grenade Court No. 125 (Figure 9)
- Practice Grenade Court No. 126 (Figure 9)
- Practice Grenade Court No. 127 (Figure 9)

Current and Future Land Use

- These AOCs are located on privately owned land and air photos suggest they are being used for agricultural purposes.
- The AOCs are located near the E.E. Wilson Wildlife Refuge. The ASR Supplement states that they are located in a wildlife reserve, "part of the Wilson Game Management Area."
- The closest residence appears to be more than 1000 feet from three of the courts (No. 125, 126, and 127).
- Residences are not located within several thousand feet of courts No. 120, 121, and 122.

Former Range Use

- The ranges were used by the Army between 1942 and 1945.
- The courts were used to allow men to throw training or practice grenades prior to throwing a live grenade (see Figure G).
- A typical practice court consisted of a number of individual courts designed to allow men to throw under a variety of conditions.

MEC Evaluation

Types of MEC

- The munitions used at the practice courts would have included the Mk IA1 training grenade, an inert device made of cast iron with the approximate shape, size, and weight of an actual hand grenade.
- The munitions used at the practice courts may also have included the M21 practice grenades, reusable devices which contained only small charges of black powder to simulate the detonation of a live grenade.
- There is not a significant hazard from MEC associated with the practice courts, based on the training devices used, as indicated in Table 2.

MC Evaluation

Types of MC

- The small quantity of black powder (consisting of potassium nitrate, sulfur, and charcoal) associated with training grenades does not pose a significant risk of environmental contamination, as indicated in Table 2.

Evaluation/Investigation Needed

- No field investigation is required for the practice grenade courts.

Conceptual Site Model – Chemical Identification Area No. 182

Current and Future Land Use

- This AOC is located on privately owned land and air photos suggest it is being used for agricultural purposes (Figure 11).
- The closest residences appear to be between 1000 feet and 2000 feet from the area.

Former Range Use

- The area was used by the Army between 1942 and 1945.
- According to a Camp Adair Training Aids General Layout map dated January 1944, Range No. 182 was used for chemical warfare materiel (CWM) recognition and decontamination exercises. Another map lists the area as a gas chamber.
- CWM recognition training was likely to have included the use of "sniff sets" and/or detonation sets.
- "Sniff sets" were several bottles containing small quantities of CWM gases or solids; bottles were opened so that trainees could experience the smell of the specific CWM.
- Detonation sets were several containers holding larger quantities of CWM agents, which were detonated, creating an agent cloud. Trainees would then try to identify the agent based on its odor and other characteristics.
- Decontamination exercises, as documented in historical photos from the camp, involved small sections of wooden floors and walls contaminated by vesicant gas (mustard and lewisite) being treated with a decontaminant solution such as "chloride of lime."
- Other CWM activities documented at Camp Adair that may have been conducted at this location include:
    - Decontamination of mustard-contaminated vehicles,
    - Neutralization of chemical land mines, possibly containing mustard filling,
    - Field simulation of a CWM battlefield, in which troops traverse an area, contaminated with a mustard mixture, applying their training skills.
    - Gas mask training using tear gas in gas chambers.

MEC Evaluation

Types of MEC

- The limited quantities of explosive MEC, e.g., blasting caps or detonating cord, that may have been used at these locations do not pose a significant risk, as indicated in Table 2.
- Any CWM used at this area, e.g., identification sets and possibly chemical land mines, would have been used under highly controlled settings. The potential for CWM to be present is extremely low and does not pose a significant risk.

MC Evaluation

Types of MC

- The small quantity of explosive material that may have been used in this area does not pose a significant risk of environmental contamination, as indicated in Table 2.
- Any CWM agents that may have been released in this area would not be expected to have persisted and/or have been released in quantities that would pose a significant risk of environmental contamination.

Evaluation/Investigation Needed

- No field investigation is required for the practice grenade courts.

Data Gaps

- In general, the presence of MEC at Camp Adair is established by past encounters, which have occurred as recently as 2001.
- MEC has not been found within any small arms range AOCs (except at Range Complex No. 4 which overlaps the explosive munitions Mortar Range AOC). The presence of MEC is considered to be unknown at all small arms ranges. Based on past use and the lack of encounters with MEC since closure of Camp Adair, limited reconnaissance surveys could support an SI determination of whether MEC is present or absent.
- MEC has been found at five of six explosive munitions range AOCs. The sixth AOC, Bombing Target No. 1, overlaps Range Complex No. 2, where MEC has been found. If reconnaissance surveys were conducted under this SI, they would not provide a degree of certainty sufficient to demonstrate the absence of MEC. Conservatively, the presence of MEC is considered to be established at all explosive munitions range AOCs.
- MEC has been found at two of three live hand grenade court AOCs. Reconnaissance surveys consistent with the scope of this SI could not definitively demonstrate the absence of MEC at these AOCs. Based on similar histories, the presence of MEC is considered to be established at all three live hand grenade court AOCs.
- MEC has not been found at any practice grenade court AOCs or at Chemical Identification Area No. 182. Based on the controlled and limited nature of munitions activities that occurred at these AOCs, the absence of MEC is considered to be established without the need for reconnaissance.
- Analytical data that would demonstrate the presence or absence of MC are lacking at all AOCs. With the exception of the practice grenade court AOCs and Chemical Identification Area No. 182, where absence of MC is established by the controlled and limited nature of munitions activities, sampling of one or more potentially affected media is required at all AOCs.

Results of the current status of data requirements with respect to MEC and MC for the AOCs located at the former Camp Adair are summarized below:

AOC	Presence or Absence of MEC	Presence or Absence of MC	Proposed Inspection Activities
Small Arms Ranges			
Infiltration Range No. 143	Unknown	Unknown	Reconnaissance for MEC and sample targets. Soil sampling.
Range Complex No. 4	Unknown	Unknown	Reconnaissance for MEC and sample targets. Soil and sediment sampling.
Range Complex No. 5	Unknown	Unknown	Reconnaissance for MEC and sample targets. Soil and groundwater sampling.
Range Complex No. 6	Unknown	Unknown	Reconnaissance for MEC and sample targets. Soil and groundwater sampling.
Skeet Range No. 580	Absent	Unknown	Reconnaissance for sample targets. Soil sampling.
Explosive Munitions Ranges			
Range Complex No. 1	Present	Unknown	Reconnaissance for sample targets. Sample soil, sediment, and groundwater.
Range Complex No. 2	Present	Unknown	Reconnaissance for sample targets. Sample soil, sediment, and groundwater.
Bombing Target No. 1	Present	Unknown	Reconnaissance for sample targets. Sample soil, sediment, and groundwater.
Range Complex No. 3	Present	Unknown	Reconnaissance for sample targets. Sample soil, sediment, and groundwater.
Mortar Range	Present	Unknown	Reconnaissance for sample targets. Sample soil, sediment, and groundwater.
Moving Target Range No. 75	Present	Unknown	Reconnaissance for sample targets. Sample soil, sediment, and groundwater.
Live Hand Grenade Courts			
East Live Hand Grenade Court	Present	Unknown	Reconnaissance for sample targets. Sample soil. Sample groundwater near one of three live hand grenade courts.
West Live Hand Grenade Court	Present	Unknown	Reconnaissance for sample targets. Sample soil. Sample groundwater near one of three live hand grenade courts.

AOC	Presence or Absence of MEC	Presence or Absence of MC	Proposed Inspection Activities
Live Hand Grenade Court No. 129	Present	Unknown	Reconnaissance for sample targets. Sample soil. Sample groundwater near one of three live hand grenade courts.
Practice Grenade Courts			
Practice Grenade Court No. 120	Absent	Absent	Reconnaissance and sampling are not required.
Practice Grenade Court No. 121	Absent	Absent	Reconnaissance and sampling are not required.
Practice Grenade Court No. 122	Absent	Absent	Reconnaissance and sampling are not required.
Practice Grenade Court No. 125	Absent	Absent	Reconnaissance and sampling are not required.
Practice Grenade Court No. 126	Absent	Absent	Reconnaissance and sampling are not required.
Practice Grenade Court No. 127	Absent	Absent	Reconnaissance and sampling are not required.
Chemical Identification Area			
Chemical Identification Area No. 182	Absent	Absent	Reconnaissance and sampling are not required.

Proposed Sampling Scheme

Proposed Field Investigation

The proposed field investigation to be conducted at the former Camp Adair is detailed below. The investigation approach will be defined in more detail in a SSWP that will be submitted to ODEQ and other stakeholders for review. The SSWP will reference technical details including sampling and analytical methods that are described in the *Type I Work Plan, Site Inspections at Multiple Sites* (Work Plan), prepared by Shaw and submitted to USACE as final in February 2006. The following methodologies will generally apply.

Reconnaissance

A visual reconnaissance of selected portions of each AOC will be performed prior to any sampling. The inspection will be conducted by a qualified UXO technician, with the aid of a hand-held magnetometer, to assure that personnel avoid any potential MEC at all times and to select optimal sample locations within the area. Special attention will be given to physical features such as berms or hillsides that may have served as range backstops or impact areas, as well as indications of munitions debris or other objects such as targets that could indicate the potential presence of MC. A global positioning system (GPS) will be used to record discovered MEC, munitions debris, and sample point locations. Digital photographs will be taken to document significant features. At AOCs where reconnaissance objectives are limited to MEC avoidance and sample selection, specific reconnaissance transects will not be recorded.

At the small arms range AOCs, the reconnaissance will have an additional objective of assessing the presence or absence of MEC within a portion of the AOC. Several transects will be walked through targeted areas during which visual observations and magnetic anomalies will be noted. The path walked will be recorded using GPS, and appropriate features influencing the survey will be noted, such as vegetation density and type, topography, etc. If MEC is found, the qualified UXO technician will attempt to make a determination of the hazard, and appropriate notifications will be made as detailed in the Work Plan and SSWP.

Sampling

Surface soil samples will be collected at a depth of approximately 0 to 2 inches bgs. Surface soil samples will be composite samples (7-point, wheel pattern with 2-foot radius). Sediment samples will be collected from a similar depth but will generally be discrete samples in order to retrieve material from specific, localized, surface water drainage features. Where soil and sediment samples may have been impacted by small arms fire (i.e., the small arms and explosive munitions AOCs), samples will be passed through an ASTM No. 10 (2-mm) wire mesh sieve at the laboratory prior to analysis for lead or selected metals in order to remove coarser particles and foreign objects, including large metallic lead fragments from bullets which have a low degree of bio-availability (Interstate Technical and Regulatory Council, 2003, *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges*).

Groundwater samples will be collected only from pre-existing wells within or near the AOCs. Generally, it is anticipated that private, domestic water wells will be sampled. Samples for analysis of lead or selected metals will be tested for dissolved lead or metals content.

The proposed sampling for the AOCs at Camp Adair is summarized in Table 3.

Analyses

USEPA SW-846 Method 6020A will be used to analyze for lead or selected metals in soil and water. USEPA SW-846 Method 8330A/Modified 8330A will be used for explosives analyses of soil and water. USEPA SW-846 Method 6850 will be used for perchlorate analysis of water.

Background Sampling

Background samples will be collected from locations that are believed to be unaffected by munitions activity. Five soil, three sediment, and three groundwater samples will be collected for background purposes and analyzed for selected metals.

Data Quality Objectives

Site Inspection
Camp Adair/Adair Air Force Station

Technical Project Planning Meeting
April 5, 2006

Data Quality Objectives

- The DQO process is used to document how the project makes decisions.
- DQOs are intended to capture project-specific information such as the intended data use(s), data needs, and how these items will be achieved.
- Information captured through DQOs will be used as a benchmark for determining if identified objectives are met.
- USACE DQOs fall under four phases:
    - Identify the current project;
    - Determine data needs;
    - Develop data collection options; and
    - Finalize data collection program.

Phase I: Identify the Current Project

1. Team members identified to date include: USACE – representatives from the Omaha Design Center and the Seattle District; Shaw Environmental, Inc. as a USACE contractor; and ODEQ.

   Question: Is there any person or organization missing from this Team?

2. The AOCs are identified as:

Small Arms Range AOCs – Ranges where only small arms, up to .50 caliber, were used.

- Infiltration Range No. 143
- Range Complex No. 4
- Range Complex No. 5
- Range Complex No. 6
- Skeet Range No. 580

Explosive Munitions Range AOCs – Ranges where explosive munitions were used (excluding grenade courts.

- Range Complex No. 1
- Range Complex No. 2
- Bombing Target No. 1
- Range Complex No. 3
- Mortar Range
- Moving Target Range No. 75

Live Hand Grenade Court AOCs – Ranges dedicated to grenade training using live hand grenades.

- East Live Hand Grenade Courts
- West Live Hand Grenade Courts
- Live Hand Grenade Court No. 129

Practice Grenade Court AOCs – Ranges dedicated to grenade training using training or practice grenades.

- Practice Grenade Court No. 120
- Practice Grenade Court No. 121
- Practice Grenade Court No. 122
- Practice Grenade Court No. 125
- Practice Grenade Court No. 126
- Practice Grenade Court No. 127

Other AOC – An area used for training in the identification and decontamination of chemical agents.

- Chemical Identification Area No. 182

Question: Are there any other AOCs to be identified?

Three locations where MEC was found within or near the cantonment area are identified in the ASR. These items are considered anomalous and may have been transported from their original location of discovery. An AOC is not identified based on this MEC.

3. Based on information available about the site and shared through discussions with USACE, concerns about this area have been expressed by the ODEQ, as well as by local residents (who have discovered and reported MEC).

   Question: Are there additional concerns or issues from landowners or other stakeholders regarding the Camp Adair area?

   Question: Are there any administrative or stakeholder concerns or constraints that would prevent site inspection activities from going forward on the decision path for this site?

Phase II: Determine Data Needs

4. Existing site information includes an ASR and ASR Supplement both prepared by the USACE in 2001 and 2004, respectively. Regional hydrogeology is characterized in Conlon, T.D., K.C. Wozniak, D. Woodcock, N.B. Herrera, B.J. Fisher, D.S. Morgan, K.K. Lee, and S.R. Hinkle, 2005, *Ground-Water Hydrology of the Willamette Basin, Oregon*, U.S. Geological Survey, Scientific Investigations Report 2005-5168.

   Question: Are there any other pertinent documents relating to the site available?

5. The site-specific approach for this SI involves collating and assessing available site information, to include site geology, hydrogeology, groundwater, surface water, ecological information, human use/access, and current and future land uses; as well as considering conduct of site inspection and sampling activities.

   Question: Are there any other site aspects/information that should be considered?

6. Based on prior site investigations, soil is the primary affected medium at Camp Adair. Surface water is a potential pathway of MC. Groundwater is also a potential pathway and is likely to discharge to surface water in major streams. Air is a potential pathway if soil particles become airborne; screening values for soil will be used that are protective of this pathway. Considering current and future land use, receptors of any contaminants that may be present could include residents, workers, recreational users, livestock, and wildlife.

   Question: Do team members concur with the CSM?

   - **Practice grenade courts and Chemical Identification Area No. 182 do not require field investigations.**
   - **MEC and MC will be evaluated at small arms range AOCs.**
   - **MC will be evaluated at explosive munitions ranges and live hand grenade courts; the presence of MEC at these AOCs is known based on past encounters with MEC.**

7. Technical considerations and/or constraints need to be identified and addressed before conducting any additional sampling, and would depend on the approach and additional data needs decided upon by team members.

   Questions:

   - **Are any data missing?**
   - **What is the nature of needed data?**
   - **What data gaps would additional data meet for making a decision about the site?**

- **Are there any considerations/constraints that need to be addressed for collecting additional data?**

Phase III: Develop Data Collection Options

8. Proposed approach:

    1. Find suitable background sample locations and sample.
    2. Conduct reconnaissance surveys for MEC and sample at small arms range AOCs.
    3. Conduct reconnaissance for sampling and collect samples at explosive munitions range and live hand grenade court AOCs.

    Question: Based on the desired decision endpoints and information known to date, what additional information is needed to reach a determination of No Department of Defense Action Indicated (NDAI) or further action?

    Question: Are the stakeholders in agreement with the sampling approach program?

    Question: Are the stakeholders in agreement with the proposed approach for collecting background data?

Phase IV: Finalize Data Collection Program

9. What concentrations of COCs lead to decision end-points?
   Note: Oregon standards and other screening values are provided in Tables 4, 5, 6, 7, and 8.

   - At or below risk-based screening levels = NDAI.
   - Above risk-based screening levels and background = RI/FS.

   Question: What approach is appropriate for evaluating ecological risk?

   Question: To what extent are both total and leachate analytical results for metals (or lead) required to assess MC in soils and sediment?

   Question: Are there any additional sampling and analysis methodologies needed for all team members to arrive at a decision end-point?

10. Assuming that additional data are needed for the former Camp Adair FUDS SI, it is important for all team members to agree with the sampling strategy and analysis.

    Question: Given the additional sampling and analysis methodologies, are there impacts to the project schedule that need to be accommodated?

Next Steps

- Scheduling of a 2nd TPP meeting will occur as agreed upon by team members.
- Shaw will prepare the TPP Memorandum and distribute for concurrence.
- Shaw will prepare the SSWP for review and comment.
- Shaw will collect samples.
- Shaw will prepare the SI Report.

Figures

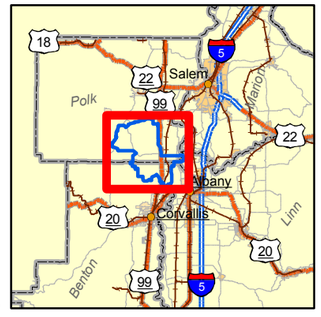
OFFICE	DRAWN BY		DRAWING NUMBER
mnrvl	K. Masterson	2/28/06	CampAdair_001_fig01_siteLayout

123°24'0"W
123°18'0"W
123°12'0"W
44°48'0"N
44°42'0"N
Powell
Main
Monmouth
Polk Marine Park
River
Riverside
Corvallis
MarionCounty
PolkCounty
Skyline
A-27
A-38
A-63
A-63 Lewisville Cemetary
BOMBING TARGET NO. 1
RANGE COMPLEX NO. 2
RANGE COMPLEX NO. 3
Sarah Helmick State Park
Buena
Vista
RANGE COMPLEX NO. 1
EAST LIVE HAND GRENADE COURT
LIVE HAND GRENADE COURT NO. 129
WEST LIVE HAND GRENADE COURT
PRACTICE GRENADE COURTS NO.s 125, 126, 127
CHEMICAL INDENT AREA NO. 182
MOVING TARGET RANGE NO. 75
RANGE COMPLEX NO. 4
RANGE COMPLEX NO. 5
E.E. Wilson Wildlife Refuge
BentonCounty
Springhill
Conser
INFILTRATION RANGE NO. 143
PRACTICE GRENADE COURTS NO. 120, 121, 122
MORTAR RANGE
RANGE COMPLEX NO. 6
SKEET RANGE NO. 580
North Albany Park
Benton
Gibson Hill
99
Valley
Kings
LinnCounty

Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Impact Areas
- State
- Privately Owned Land
- Bureau of Land Management
- Reported MEC Find
- Target Center

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.



0 0.5 1 2 Miles

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 1

SITE LAYOUT

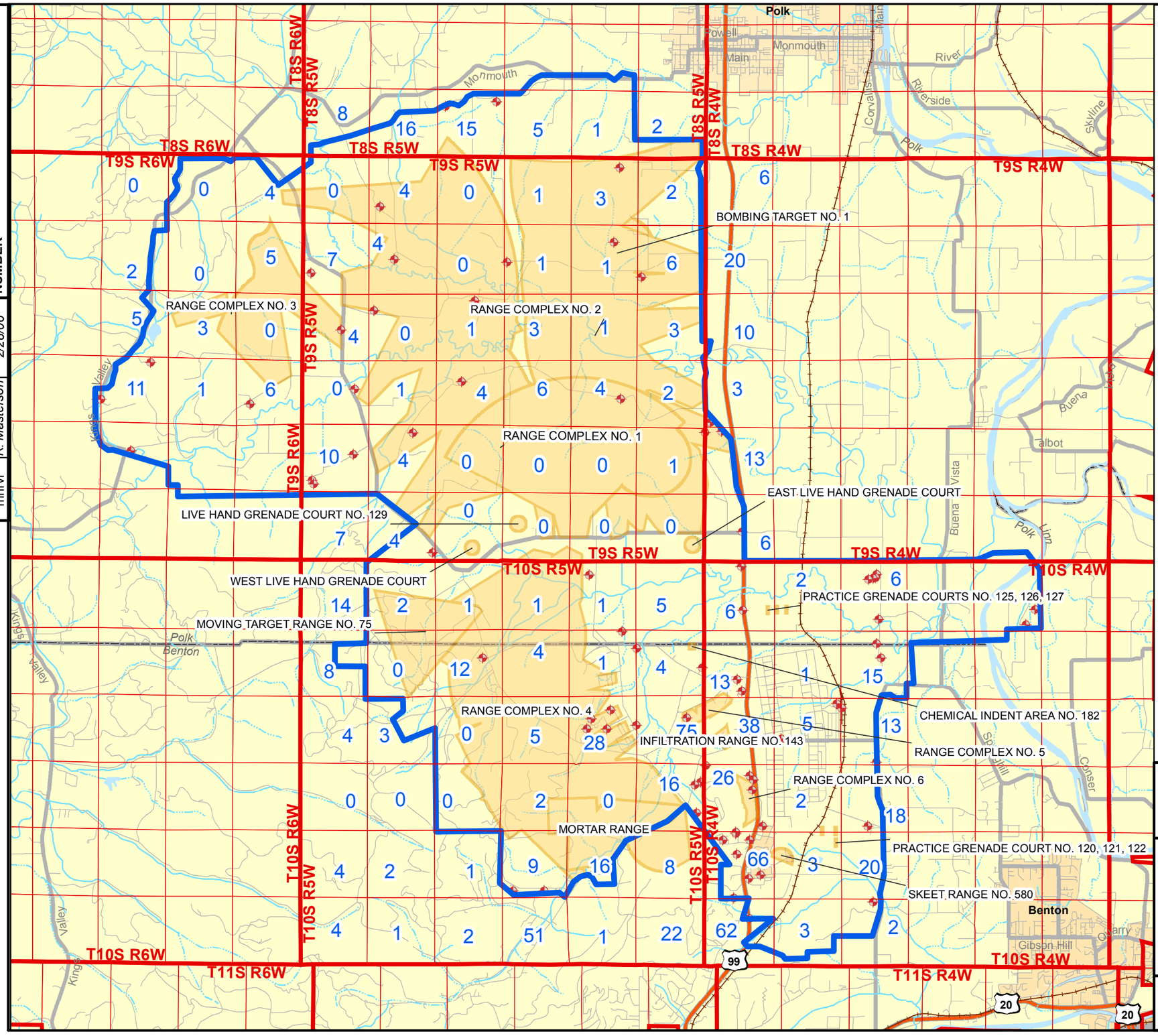
CAMP ADAIR

Shaw® Shaw Environmental, Inc.

DRAWING NUMBER: CampAdair_002_fig02_siteLayout

DRAWN BY: K. Masterson 2/28/06

OFFICE: mnrvl



Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Township and Range
- 4 Section Line (No. Wells in Section)
- Well (Source: USGS)

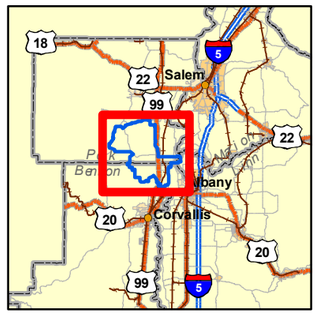
Sectionalized Township
Section Number

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Williamette Watershed.

N

0 0.5 1 2
Miles



REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 2

WATER WELL DATA

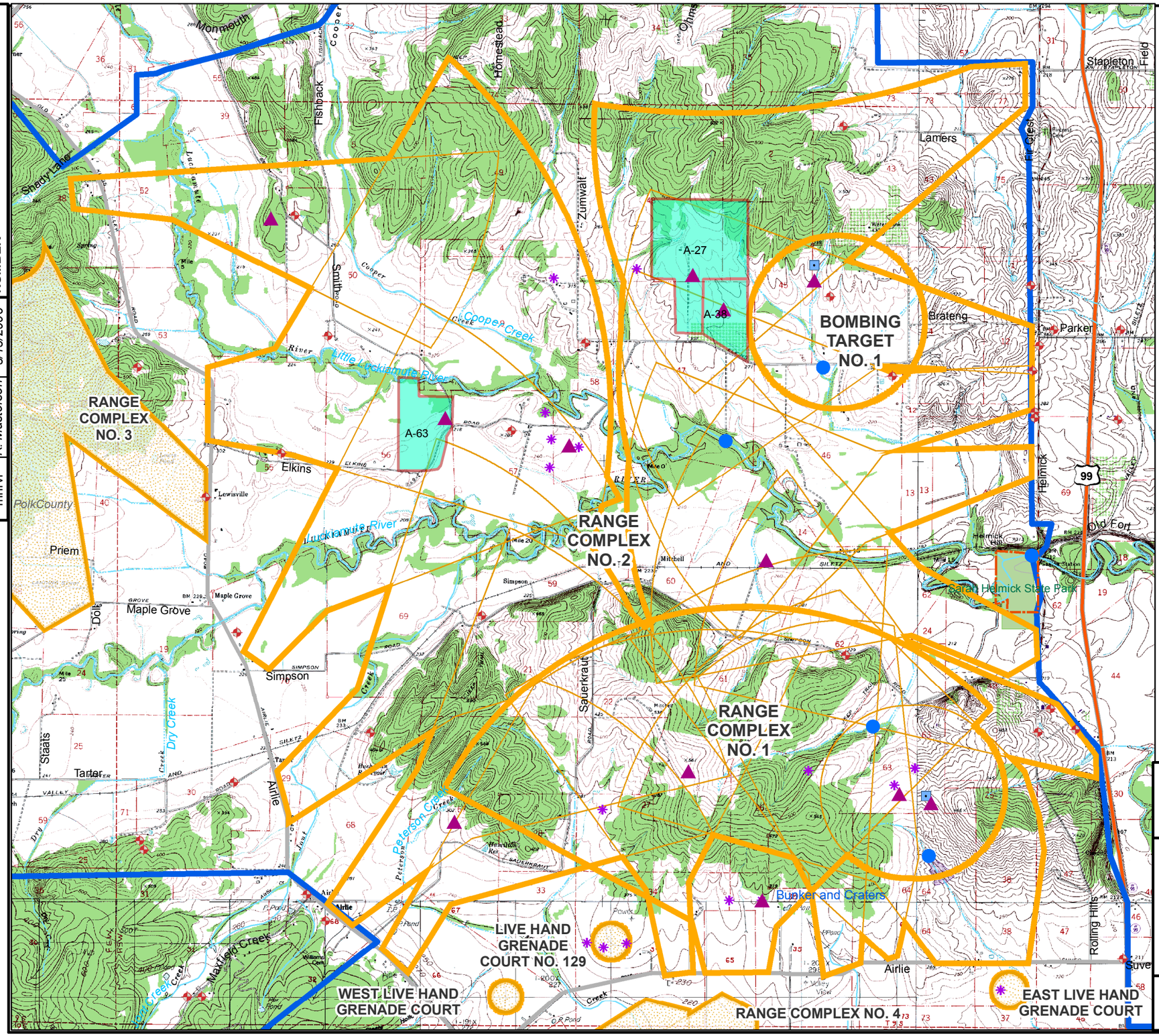
CAMP ADAIR

Shaw Shaw Environmental, Inc.

DRAWING NUMBER: CampAdair_003_fig02_rc1_rc2_bt1

DRAWN BY: K. Masterson 3/13/2006

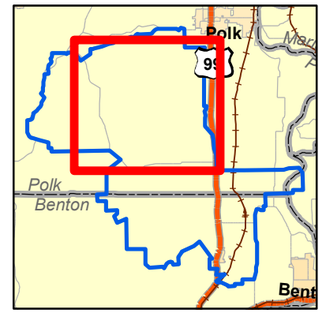
OFFICE: mnrvl



Legend

- Camp Adair Installation Area
- Camp Adair Area of Concern
- Impact Areas
- Public Land (2003)
- Target Center
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.



0 3,500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 3

RANGE COMPLEXES NO. 1 and NO. 2 AND BOMBING TARGET NO. 1

CAMP ADAIR

Shaw Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER
mnrvl	K.Masterson	3/13/06	CampAdair_003A_fig03A_RC1_ne

RANGE COMPLEX NO. 2
- FIELD COMBAT RANGE NO. 88

BOMBING TARGET NO. 1

RANGE COMPLEX NO. 2
- FIELD COMBAT RANGE NO. 87

RANGE COMPLEX NO. 2
- FIELD COMBAT RANGE NO. 87A

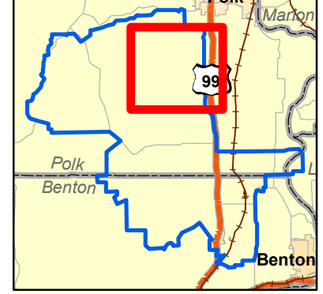
RANGE COMPLEX NO. 2
- FIELD COMBAT RANGE NO. 78B

RANGE COMPLEX NO. 2
- FIELD COMBAT RANGE NO. 84A

Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Impact Areas
- Taxlot Parcel
- Public Land (2003)
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for owner information.



0 2,200 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

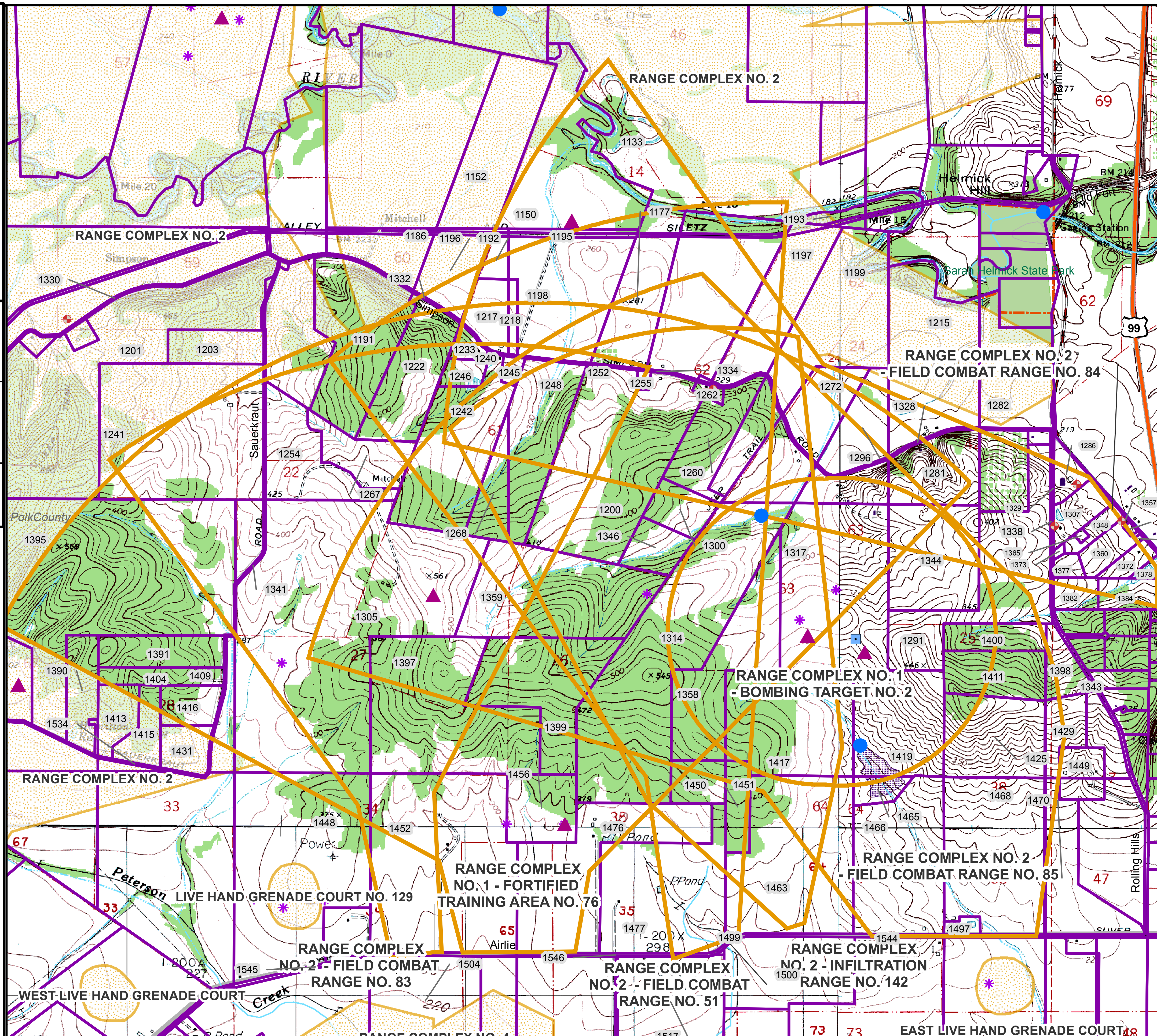
U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 3A
RANGE COMPLEXES NO. 1 and 2 (NORTHEAST)

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

OFFICE	DRAWN BY	DRAWING NUMBER
CEN	K. Masterson 2/28/06	CampAdair_003b_fig03b_RC2se



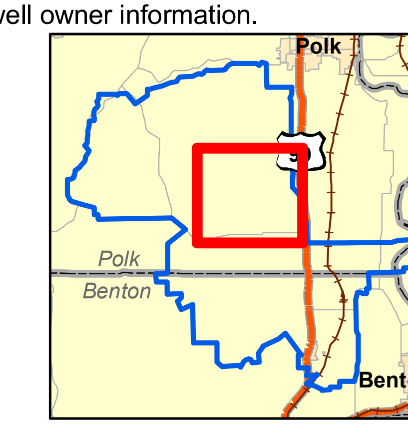
Legend

- Camp Adair Installation Area
- CampAdair_historic_impact_area2
- Taxlot Parcel
- Public Land (2003)
- Target Center
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See Parcel table for well owner information.

N

0 2,000 Feet



REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

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OMAHA DESIGN CENTER

FIGURE 3B
RANGE COMPLEXES NO. 1 and 2 (SOUTHEAST)

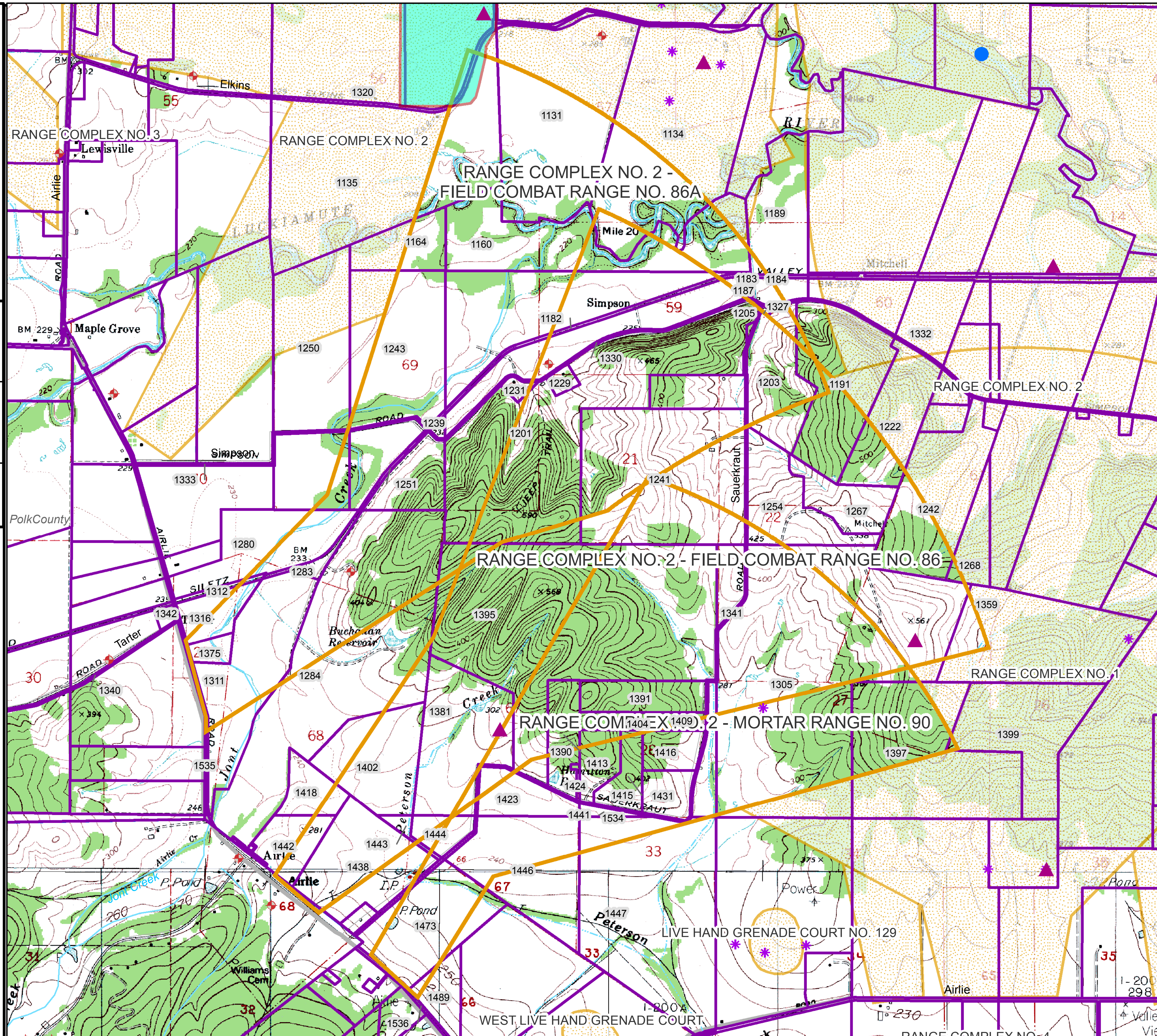
CAMP ADAIR

Shaw® Shaw Environmental, Inc.

DRAWING NUMBER: CampAdair_003C_fig03C_RC2sw

DRAWN BY: K. Masterson 3/13/06

OFFICE: mnrvl

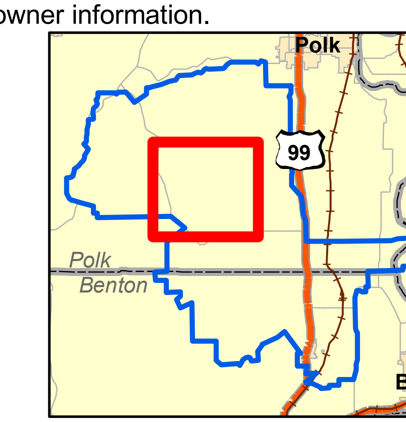


Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Impact Areas
- Taxlot Parcel
- Public Land (2003)
- Dudded Impact Point
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:

1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for owner information.



0 2,000 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 3C

RANGE COMPLEX NO. 2 (SOUTHWEST)

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

DRAWING NUMBER	CampAdair_003d_fig03d_RC2nw
DRAWN BY	K. Masterson
3/13/06	
OFFICE	mnrvl

RANGE COMPLEX NO. 2
- FIELD COMBAT RANGE NO. 89B

RANGE COMPLEX NO. 2
- MOVING TARGET RANGE NO. 79B

RANGE COMPLEX NO. 2
- MOVING TARGET RANGE NO. 79A

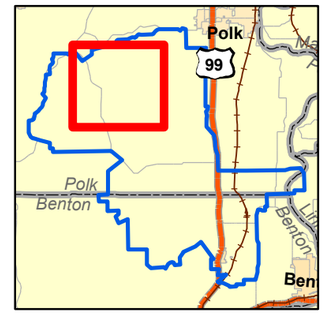
RANGE COMPLEX NO. 2

RANGE COMPLEX NO. 3

Legend

- Camp Adair Installation Area
- Camp Adair AOC
- Impact Areas
- Taxlot Parcel
- Public Land (2003)
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for owner information.



0 2,200 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 3D

RANGE COMPLEX NO. 2 (NORTHWEST)

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

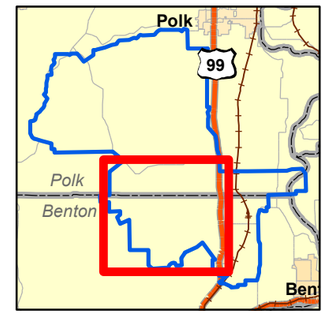
OFFICE	DRAWN BY	DRAWING NUMBER
MNRVL	K.Masterson 02/28/06	CampAdair_005_fig05_rc4

LIVE HAND GRENADE COURT NO. 129
RANGE COMPLEX NO. 1
RANGE COMPLEX NO. 2
WEST LIVE HAND GRENADE COURT
EAST LIVE HAND GRENADE COURT
MOVING TARGET RANGE NO. 75
PRACTICE GRENADE COURT NO. 127
CHEMICAL INDENT AREA NO. 182
RANGE COMPLEX NO. 4
RANGE COMPLEX NO. 5
INFILTRATION RANGE NO. 143
RANGE COMPLEX NO. 6
MORTAR RANGE
SKEET RANGE NO. 580

Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Public Land (2003)
- National Guard Facility
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.



N

0 3,000 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 5

RANGE COMPLEX NO. 4

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

DRAWING NUMBER: CampAdair_005_fig05_rc4

DRAWN BY: K.Masterson 2/28/06

OFFICE: mnrvl

RANGE COMPLEX NO. 4 - ANTI AIRCRAFT RANGE NO. 70

RANGE COMPLEX NO. 2

WEST LIVE HAND GRENADE COURT

RANGE COMPLEX NO. 4 - TRANSITION COURSE NO. 160

MOVING TARGET RANGE NO. 75

RANGE COMPLEX NO. 4 - THOMPSON SUB MG RANGE NO. 50A

RANGE COMPLEX NO. 4 - INFILTRATION RANGE NO. 141

RANGE COMPLEX NO. 4 - KNOWN DISTANCE RIFLE RANGE NO. 4

RANGE COMPLEX NO. 4 - CLOSE COMBAT COURSE NO. 170

RANGE COMPLEX NO. 4 - FIELD COMBAT RANGE NO. 81

POLK CO

BENTON CO

Legend

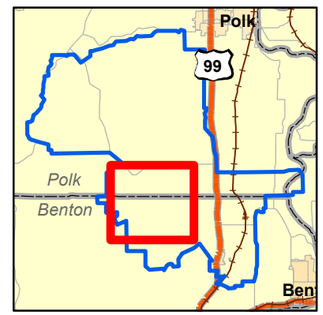
- Camp Adair Installation Area
- Camp Adair AOCs
- Parcel
- National Guard Facility
- Public Land (2003)
- Target Center (1944 Air Photo)
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:

1) AOC Boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for well owner information.

N

0 2,000 Feet



REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 5A
RANGE COMPLEX NO. 4 NORTH
CAMP ADAIR

Shaw Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER
mnrvl	K.Masterson	2/28/06	CampAdair_005_fig05_rc4

RANGE COMPLEX NO. 4 - FIELD COMBAT RANGE NO. 80A

RANGE COMPLEX NO. 4 - FIELD COMBAT RANGE NO. 80B

RANGE COMPLEX NO. 4 - KNOWN DISTANCE RIFLE RANGE NO. 3

RANGE COMPLEX NO. 4 - KNOWN DISTANCE RIFLE RANGE NO. 2

RANGE COMPLEX NO. 5

INFILTRATION RANGE NO. 143

RANGE COMPLEX NO. 4 - KNOWN DISTANCE RIFLE RANGE NO. 1

RANGE COMPLEX NO. 4 A-A RANGE 65, 66, 67

RANGE COMPLEX NO. 4 - MINI A-A RANGE 60, 61, 62

RANGE COMPLEX NO. 4 - FIELD COMBAT RANGE NO. 80

MORTAR RANGE

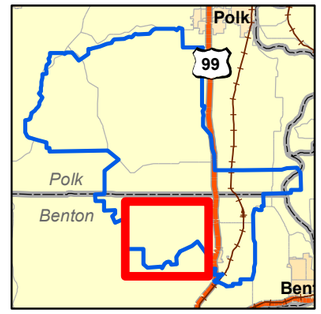
RANGE COMPLEX NO. 4 - THOMPSON SUB MG RANGE NO. 50

Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Public Land (2003)
- Parcel
- National Guard Facility
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:

1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for well owner information.



0 2,000 Feet

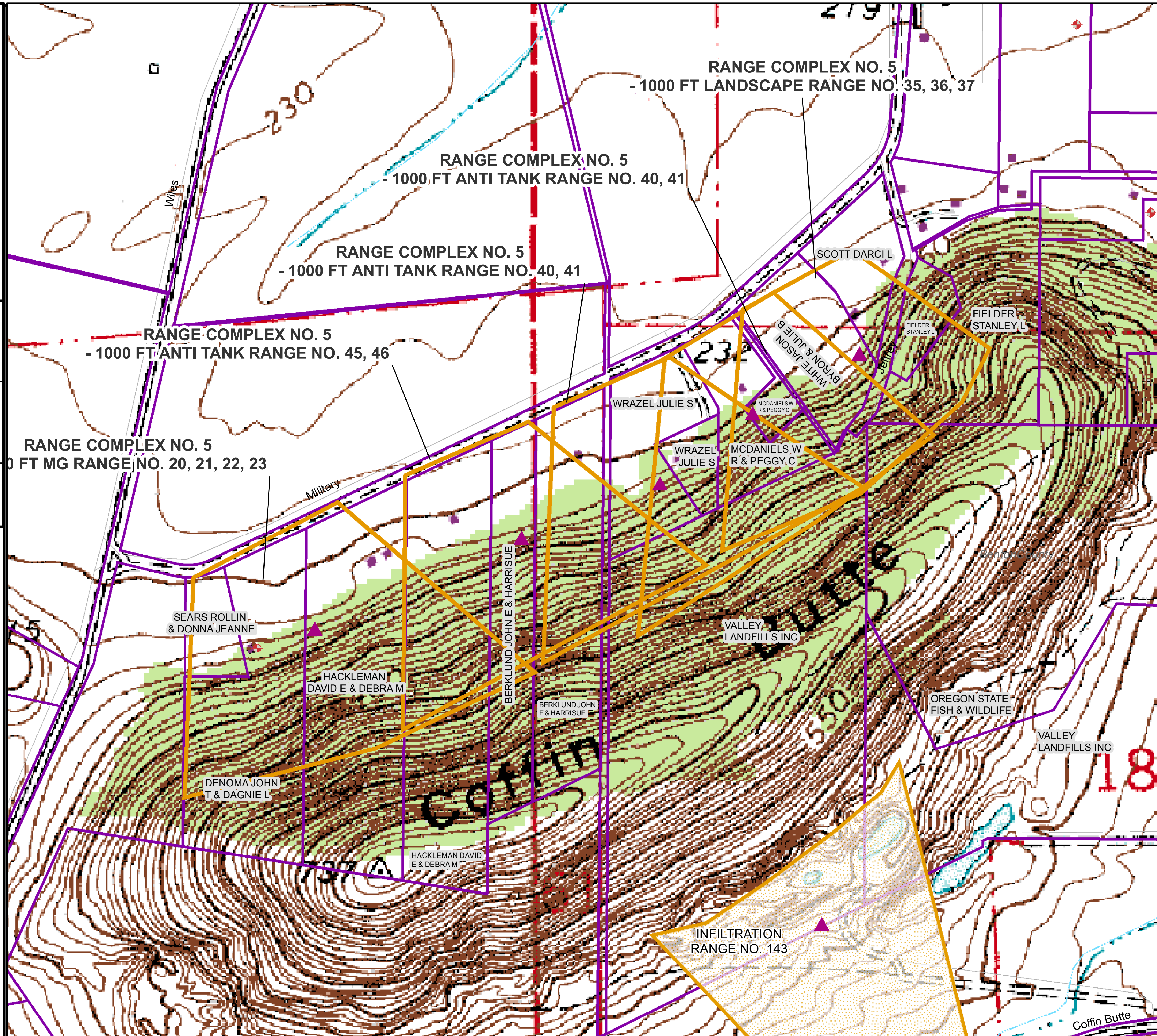
REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 5B
RANGE COMPLEX NO. 4 SOUTH
CAMP ADAIR

Shaw Shaw Environmental, Inc.

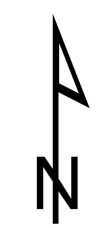
OFFICE	DRAWN BY		DRAWING NUMBER
MNRVL	K. Masterson	3/15/06	CampAdair_006_fig06_RC5

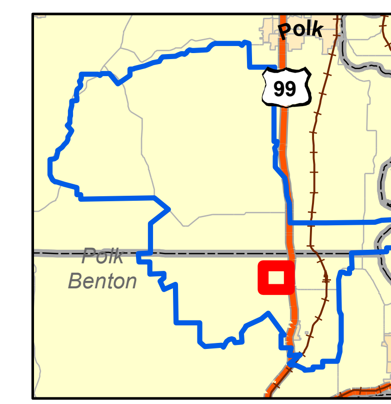


Legend

- Camp Adair AOCs
- Camp Adair Installation Area
- Taxlot Parcel
- Public Land (2003)
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for owner information.





REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

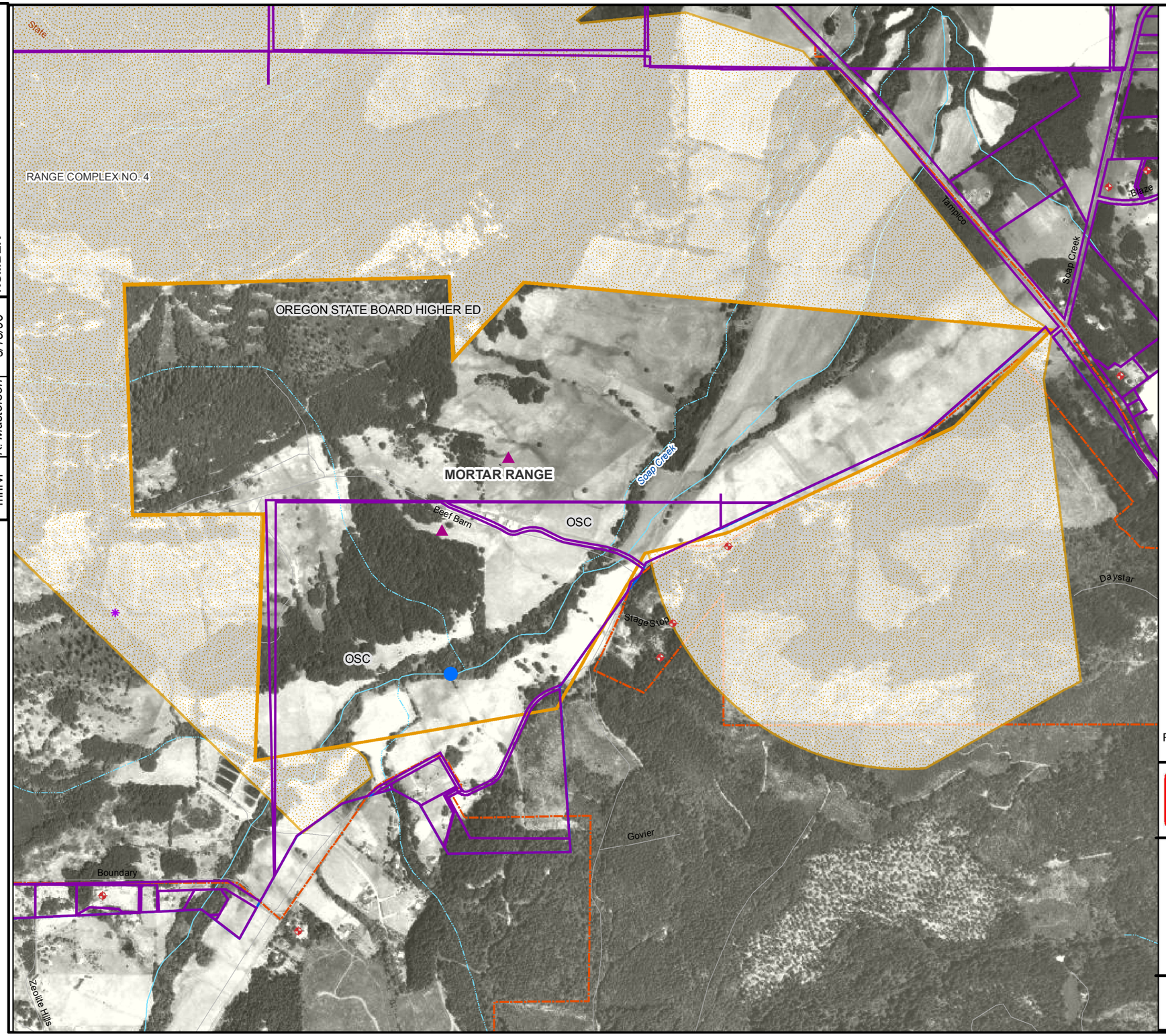
FIGURE 6

RANGE COMPLEX NO. 5

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

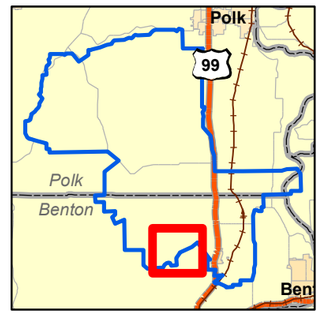
OFFICE	DRAWN BY		DRAWING NUMBER
mnrvl	K. Masterson	3/15/06	CampAdair_016_fig16_MR



Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Public Land (2003)
- Taxlot Parcel
- Reported MEC Find
- Well (Source: USGS)
- Proposed Sediment Sample Location
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for owner information.



0 1,200 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

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FIGURE 15

MORTAR RANGE

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

OFFICE	DRAWN BY	DRAWING NUMBER
mnrvl	K. Masterson 3/15/06	CampAdair_017_fig17_MR

HAMPTON RESOURCES, INC

HAGEN GEORGE E

STATE OF OREGON, RESEARCHFOREST

Dunn Forest

Staats Creek

SCHUDEL ENTERPRISES, LLC

BURCH DONALD & WILMA, RV LV TR

SCHUDEL ENTERPRISES, LLC

NICOLAIDES JEFFERY

SCHUDEL ENTERPRISES, LLC

STATE OF OREGON, RESEARCHFOREST

STATE OF OREGON RESEARCH FOREST

MOVING TARGET RANGE NO. 75

OREGON STATE

RANGE COMPLEX NO. 4

Tampico

OSC

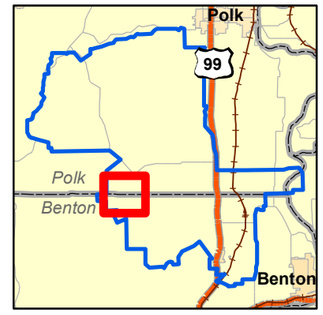
N Fork Berry Creek

OREGON STATE BOARD HIGHER ED

Legend

- Camp Adair Installation Area
- Camp Adair AOCs
- Taxlot Parcel
- Reported MEC Find
- Well (Source: USGS)
- Proposed Soil Sample Location
- Proposed Sediment Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for owner information.



0 1,000 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE 16

MOVING TARGET RANGE NO. 75

CAMP ADAIR

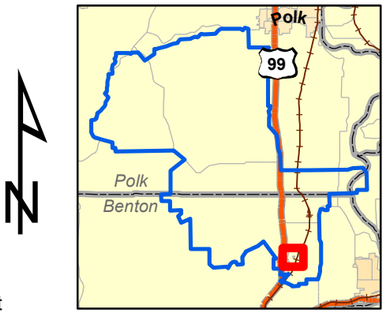
Shaw® Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER
MNRVL	K.Masterson	3/15/06	CampAdair_018_fig18_SK580

Legend

- Camp Adair Installation Area
- Taxlot Parcel
- Public Land (2003)
- Reported MEC Find
- Well (Source: USGS)
- Proposed Soil Sample Location

NOTES:
1) AOC boundaries were derived from the Camp Adair ASR Supplement.
2) Groundwater well data were obtained from USGS.
3) These ranges are located within the Willamette Watershed.
4) See parcel table for owner information.



N

0 500 Feet

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

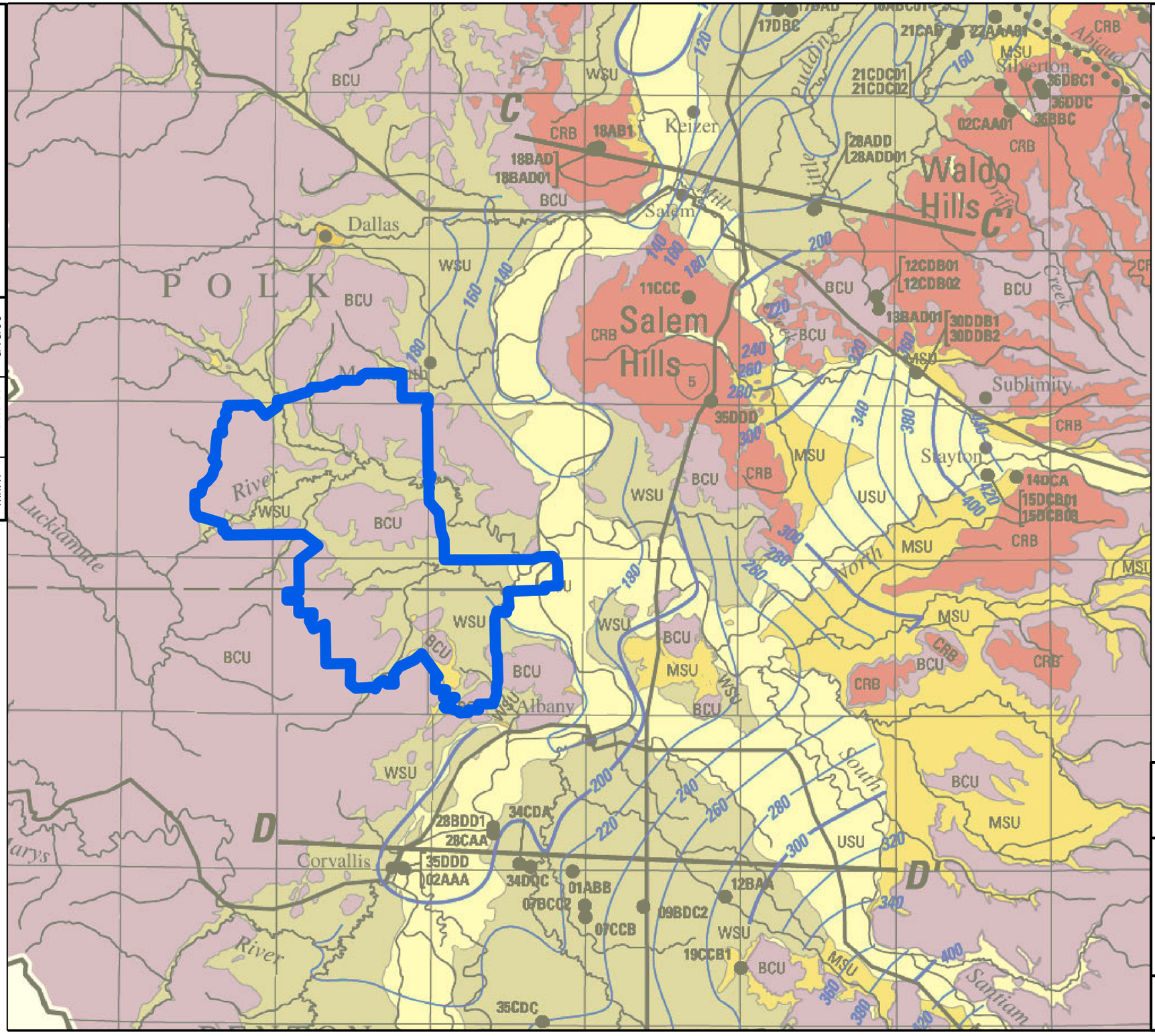
FIGURE 17

SKEET RANGE 580

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

OFFICE: mnrvl | DRAWN BY: K. Masterson 3/13/06 | DRAWING NUMBER: CampAdair_018_fig0A_willamette



Legend

Camp Adair Installation Area

EXPLANATION

Hydrogeologic unit

HCU	High Cascade unit
USU	Upper sedimentary unit
WSU	Willamette silt unit
MSU	Middle sedimentary unit
LSU	Lower sedimentary unit
CRB	Columbia River basalt unit
BCU	Basement confining unit

NOTES:

1) Map Source From USGS:
Scientific Investigation Report 2005 - 5168
Hydrogeologic map with selected wells and cross sections -Plate 1,
Conlin & OThers - Ground-water Hydrology of the Willamette Basin, Oregon

0 1.5 3 6
Miles

REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

N

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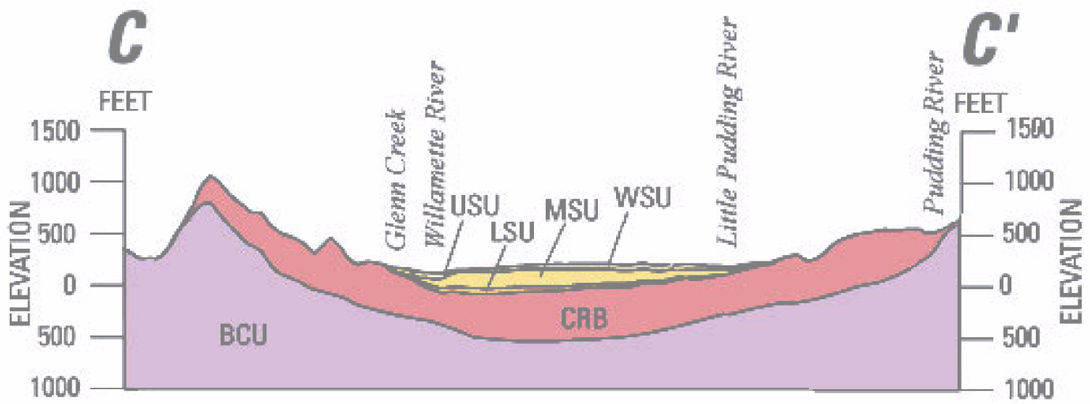
FIGURE A

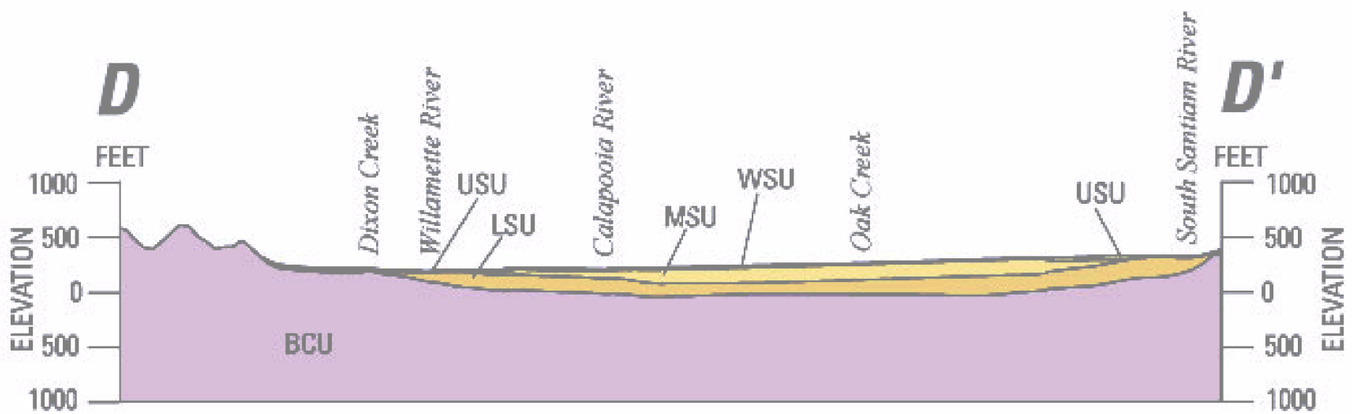
Hydrogeologic Map of Camp Adair Area

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER
mnrvl	K. Masterson	2/28/06	CampAdair_019_fig0b_xsection





EXPLANATION

Hydrogeologic unit

HCU	High Cascade unit
USU	Upper sedimentary unit
WSU	Willamette silt unit
MSU	Middle sedimentary unit
LSU	Lower sedimentary unit
CRB	Columbia River basalt unit
BCU	Basement confining unit

NOTES:
1) Map Source From USGS:
Scientific Investigation Report 2005 - 5168
Hydrogeologic map with selected wells and cross sections -Plate 1,
Conlin & OThers - Ground-water Hydrology of the Willamette Basin, Oregon

0 1.5 3 6
Miles

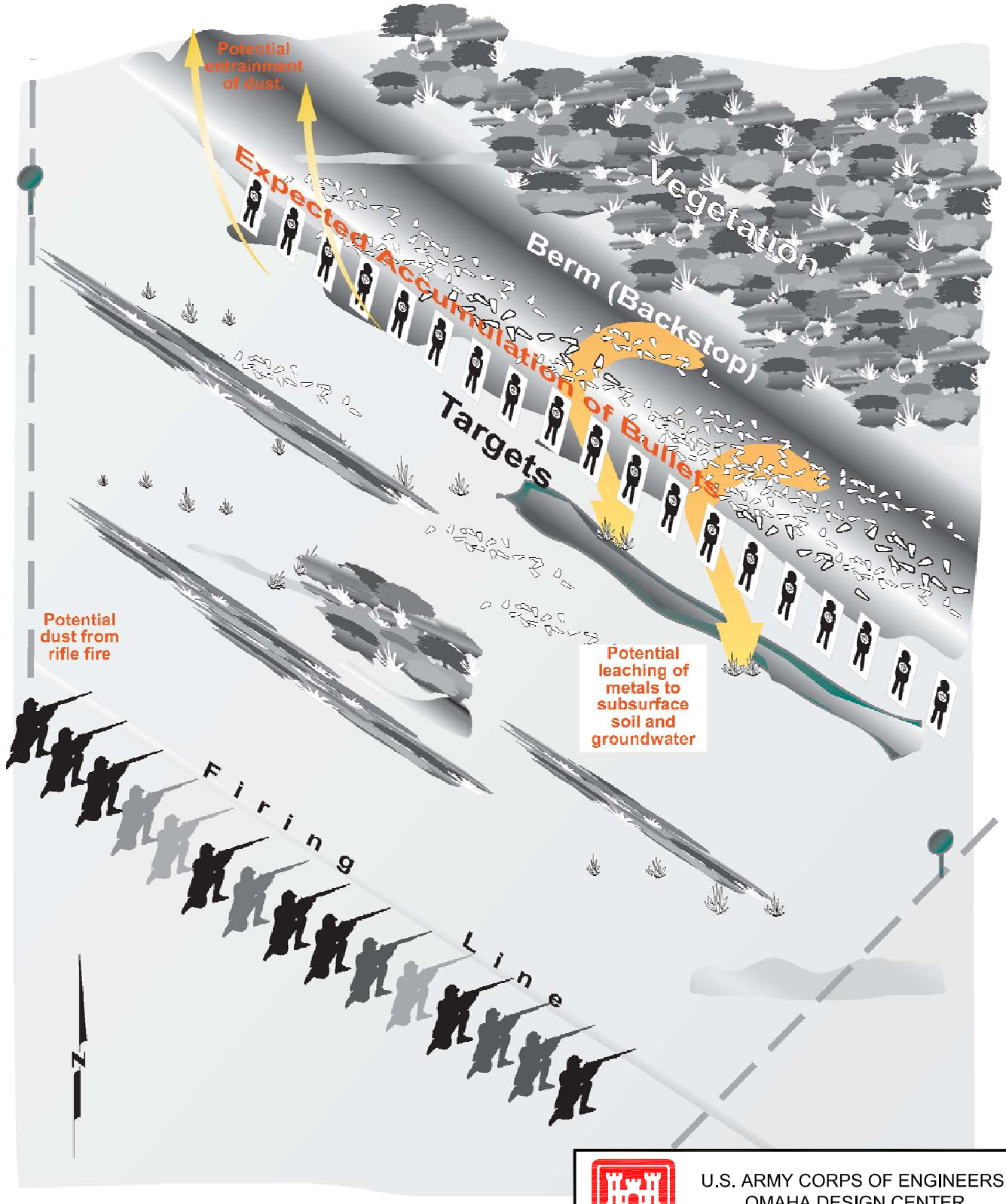
REFERENCE/PROJECTION: NAD 83 UTM Zone 10N

U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE B
Hydrogeologic Cross Sections Near Camp Adair
CAMP ADAIR

Shaw® Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER
SJ	K. Black	11/23/05	116188SJ-FIGC



U.S. ARMY CORPS OF ENGINEERS,
OMAHA DESIGN CENTER

FIGURE C

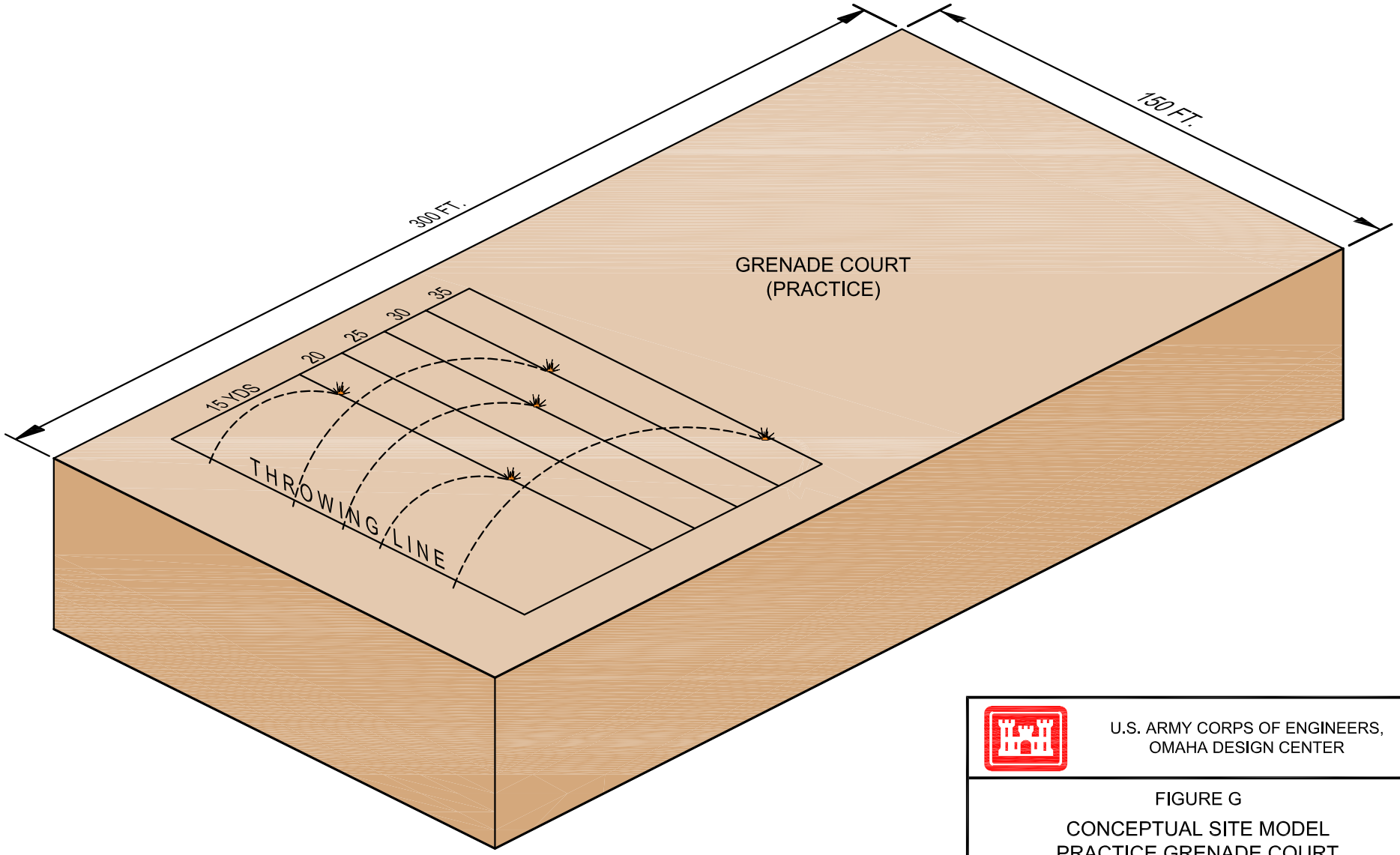
CONCEPTUAL SITE MODEL
RANGE WITH BERM

CAMP ADAIR

Shaw Environmental, Inc.

XREF Files: IMAGE Files:
File: N:\cad\DWG\116188-FUDS\116188SJ-FIGG.dwg Layout: Layout User: Kathy.Troyer Mar 15, 2006 - 4:16pm

OFFICE	DRAWN BY		DRAWING NUMBER	116188SJ-FIGG
SJ	K. Black	1-12-06		



U.S. ARMY CORPS OF ENGINEERS,
OMAHA DESIGN CENTER

FIGURE G

CONCEPTUAL SITE MODEL
PRACTICE GRENADE COURT

CAMP ADAIR

Shaw© Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER
SJ	K. Black	11/02/05	116188SJ-FIGE

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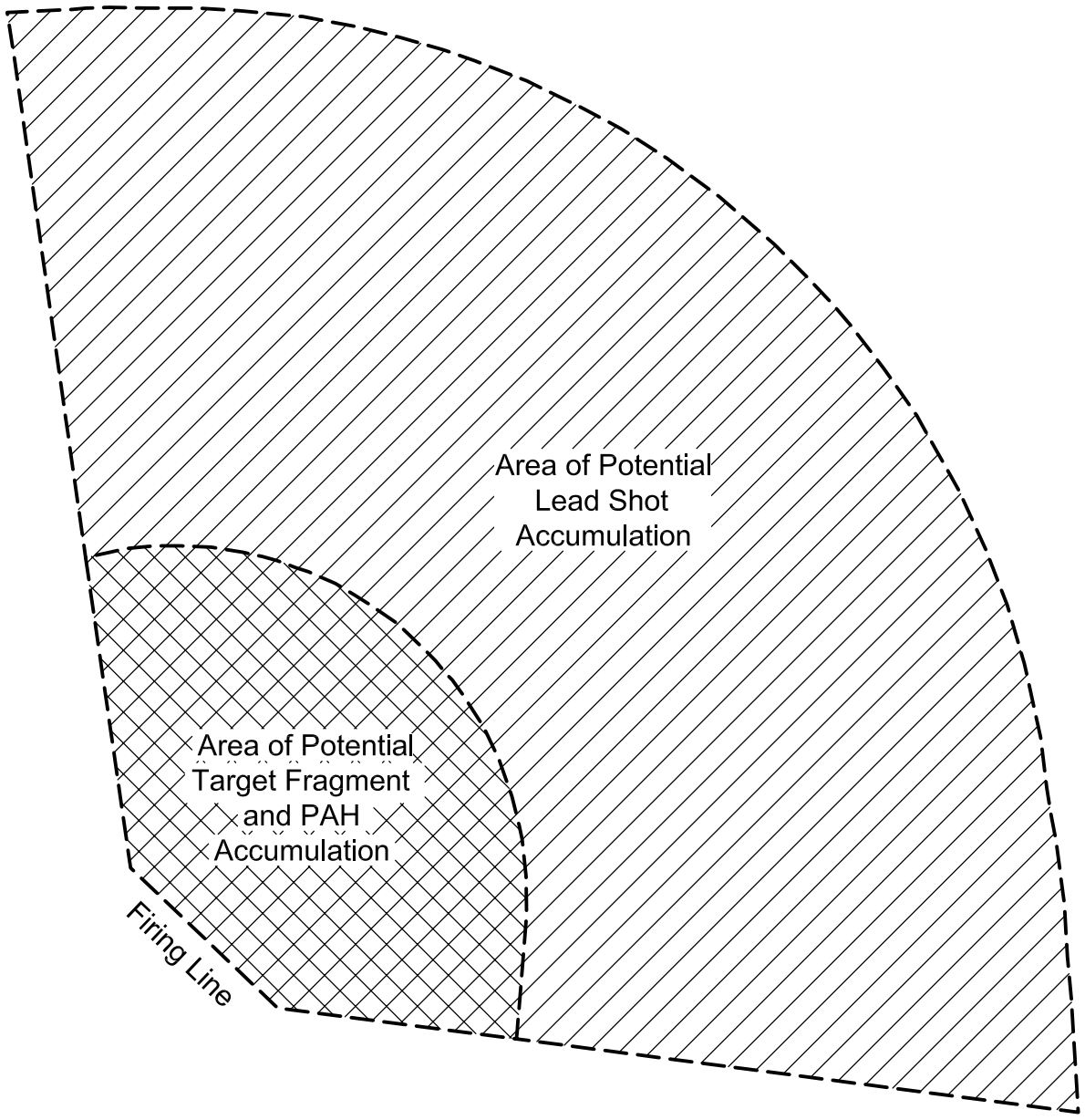
OMAHA DESIGN CENTER

FIGURE E

CONCEPTUAL SITE MODEL
MULTI-USE RANGE

Shaw® Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER
SJ	K. Black	11/02/05	116188SJ-FIGD



PLAN VIEW

SCALE

0 150 300 FEET

U.S. ARMY CORPS OF ENGINEERS,
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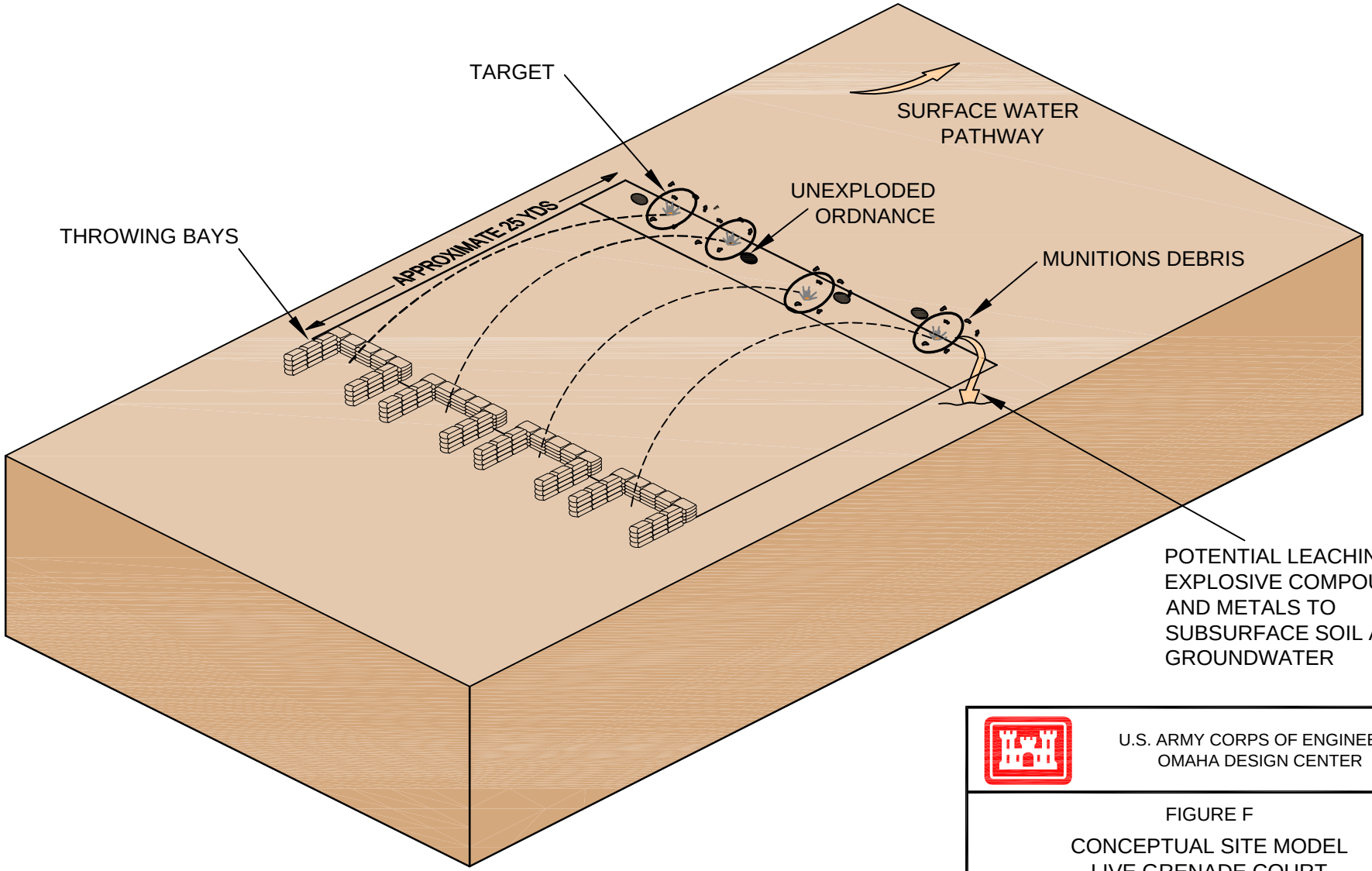
FIGURE D

CONCEPTUAL SITE MODEL
SKEET RANGE

Shaw® Shaw Environmental, Inc.

OFFICE	DRAWN BY		DRAWING NUMBER	170040A01A
CENT	MEC	3-15-06		



U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

FIGURE F

CONCEPTUAL SITE MODEL
LIVE GRENADE COURT

CAMP ADAIR

Shaw® Shaw Environmental, Inc.

WED, MAR 15, 2006 02:17 P MEC O:\116188-FUDS-CAD\0170040\REV-A\170040A01A.DWG

Tables

Table 1
MEC, MC, and Land Use Controls at Camp Adair Areas of Concern

AOC	Munitions	Munitions Constituents	Land Use Controls [1]
Skeet Range No. 580	Small Arms General	Lead, and single or doublebase black powder	no
Practice Grenade Court No. 122	M21 Practice Hand Grenade	Black Powder	
	Mk 1A1 Practice Hand Grenade	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder	no
Practice Grenade Court No. 120	M21 Practice Hand Grenade	Black Powder	
	Mk 1A1 Practice Hand Grenade	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder	no
Practice Grenade Court No. 121	M21 Practice Hand Grenade	Black Powder	
	Mk 1A1 Training Hand Grenade	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder	no
Infiltration Range No. 143	Small Arms General	Lead, and single or doublebase black powder	
	Explosives Dynamite Commercial	Nitroglycerin	
	Blasting Caps Electrical and Nonelectrical M6 & M7	Sensitive Explosive	no
Chemical Identification Area No. 182	Pot Tear Gas M1	Chloracetophenone mixture	
	Capsule Riot Control CS		
	Chemical ID Set, Instructional M1	Mustard, Chlorpicrin, Lewisite, Adamsite, Chloracetophenone, Triphosgene	
	Chemical ID Set, Detonation M1	Mustard, Lewisite, Chlorpicrin, and Phosgene	
	Chemical ID, Toxic Gas Set M1	24 bottles of 32 ounces of Mustard or Distilled Mustard	
	Toxic Chemical Munitions	No Data sheets provided	no
Practice Grenade Court No. 127	M21 Practice Hand Grenade	Black Powder	
	Mk 1A1 Training Hand Grenade	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder	no
Practice Grenade Court No. 125	M21 Practice Hand Grenade	Black Powder	
	Mk 1A1 Practice Hand Grenade	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder	no
Practice Grenade Court No. 126	M21 Practice Hand Grenade	Black Powder	
	Mk 1A1 Training Hand Grenade	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder	no
East Live Hand Grenade Court	Mk II Hand Grenade Frag	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder, M204	
	M21 Practice Hand Grenade	Black Powder	no
Live Hand Grenade Court No. 129	Mk II Hand Grenade Frag	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder	
	M21 Practice Hand Grenade	Black Powder	no

Table 1
MEC, MC, and Land Use Controls at Camp Adair Areas of Concern

AOC	Munitions	Munitions Constituents	Land Use Controls [1]
West Live hand Grenade Court	Mk II Hand Grenade Frag	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder, M204	
	M21 Practice Hand Grenade	Black Powder	no
Bombing Target No. 1	AN-M30 General Purpose Bomb, 100lbs	No Data sheets provided	
	100lb Bomb, GP, Mk 1	No Data sheets provided	
	500 lb Bomb, GP, Mk 12	Tritonal Mix	
	AN-Mk5, AN-Mk 23, AN-Mk43, Prac	No Data sheets provided	
	M38A2, Practice bomb, 100 lbs	3 lb spotting charge (Black Powder) single or double based powder	
	105mm, Fixed HE M38	Black Powder	
	155mm HE MkI	No Data sheets provided	no
Mortar Range	Small Arms General	Lead, and single or doublebase black powder	
	60mm HE M49	TNT, Ballistite	no
Moving Target Range No. 75	75mm Gun HE M48	TNT, & FNH powder	
	37mm AP M74	FNH powder	no
Range Complex No. 1	50 Cal. Machine Gun	Lead, and single or doublebase black powder	
	Small Arms General	Lead, and single or doublebase black powder	
	Mk II Hand Grenade Frag	TNT, Flaked or granular, older models used E.C. Blank Smokeless Powder, M204	
	M21 Practice Hand Grenade	Black Powder	
	100 lb Bomb, GP Mk 1	No Data sheets provided	
	500 lb Bomb, GP, Mk 12	No Data sheets provided	
	AN-M30 General Purpose Bomb, 100lbs	No Data sheets provided	
	AN-Mk5, AN-Mk 23, AN-Mk43, Prac	No Data sheets provided	
	M38A2, Practice bomb, 100 lbs	3 lb spotting charge (Black Powder) single or double based powder	
	Signal, Practice Bomb Mk 4	No Data sheets provided	
	Spotting Charge, M1A1	Single or Double based Powder (Black Powder)	
	M6A1 Rocket HEAT 2.36 inch	Pentolite, Ballistite, M400	
	M6A3 Rocket HEAT 2.36 inch	Pentolite, Ballistite, M400	
	M7A1 Practice Rocket 2.36 inch	5 sticks of Ballistite	
	M7A3 Practice Rocket 2.36 inch	5 sticks of Ballistite	
	105mm HE M1	Black Powder	
	155mm HE M107	No Data sheets provided	
	37mm HE M54	FNH powder	
	57mm APC-T M86	FNH powder	
	Large Caliber (37mm and Larger) (Incendiary Smoke)	FNH powder (propelling charge)	
	60mm HE M49	TNT, Ballistite	
	81mm HE M43	TNT, Ballistite	
	Mortars (incendiary, illumination, smoke)	No Data sheets provided	
	Explosives TNT	TNT	
	Blasting Caps Electrical and Nonelectrical M6 & M7	Sensitive Explosive	no

Table 1
MEC, MC, and Land Use Controls at Camp Adair Areas of Concern

AOC	Munitions	Munitions Constituents	Land Use Controls [1]
Range Complex No. 2	50 Cal. Machine Gun	Lead, and single or doublebase black powder	
	Small Arms General	Lead, and single or doublebase black powder	
	105mm HE M1	Black Powder	
	105mm HEAT-T M622	No Data sheets provided	
	155mm HE M107	No Data sheets provided	
	37mm HE M54	FNH powder	
	57mm APC-T M86	FNH powder	
	60mm HE M49	TNT, Ballistite	
	81mm HE M43	TNT, Ballistite	
	60mm Illuminating M721	No Data sheets provided	
	60mm Practice M50A2	Inert with Black Powder	
	81mm TP M43A1	Inert with Black Powder	
	Explosives-Commercial Dynamite	Nitroglycerin	
	Blasting Caps Electrical and Nonelectrical M6 & M7	Sensitive Explosive	no
Range Complex No. 3	50 Cal. Machine Gun	Lead, and single or doublebase black powder	
	Small Arms General	Lead, and single or doublebase black powder	
	105mm HE M1	Black Powder	
	155mm HE M107	No Data sheets provided	
	37mm HE M54	FNH powder	
	57mm APC-T M86	FNH powder	
	60mm HE M49	TNT, Ballistite	
	81mm HE M43	TNT, Ballistite	
	60mm Practice M50A2	Inert with Black Powder	
	81mm TP M43A1	Inert with Black Powder	no
Range Complex No. 4	50 Cal. Machine Gun	Lead, and single or doublebase black powder	no
	Small Arms General	Lead, and single or doublebase black powder	
Range Complex No. 5	50 Cal. Machine Gun	Lead, and single or doublebase black powder	no
	Small Arms General	Lead, and single or doublebase black powder	
Range Complex No. 6	Small Arms General	Lead, and single or doublebase black powder	no

[1] From ASR Supplement

Table 2
MEC and MC Exposure Pathway Analysis – Small Arms Ranges

Range Area & Type	MMRP Concern	Potential Contaminant of Concern (PCOCs)	Affected Media (Potential Contaminant Sources) (Fate and Transport)	PCOC Concentrations Exceed Screening Levels	Exposure Routes and Potential Receptors			Data Gaps	Activities to Address Data Gaps (i.e., Sampling)
					Site Workers/ Contractor Personnel	Residents/ General Public	Ecological		
Small Arms Ranges	**MEC**	MEC in the form of unused or discarded small arms rounds or other unknown munitions. No MEC risk is associated with skeet range.	**Surface & Subsurface Soils** • Low hazard associated with small arms rounds (stable, non-explosive projectiles). Potential for unknown explosive MEC sources.	Not Applicable	• Potentially complete pathway. • Exposure routes: - Vehicle traffic - Foot traffic - Intrusive activities - Geologic instability	• Potentially complete pathway. • Exposure routes: - Vehicle traffic - Foot traffic - Intrusive activities - Geologic instability	• Potentially complete pathway. • Exposure routes: - Foot traffic - Burrowing - Geologic instability	• Presence of MEC is unknown, except at skeet range where MEC is considered to be absent based on history of use.	Visual reconnaissance and localized magnetometer sweeps will be conducted to: • Assess presence of MEC, • Practice MEC avoidance, and • Select appropriate sample locations.
	MC	Lead Antimony and copper (in lower concentrations than lead; therefore inspection will focus on lead) Infiltration ranges--also TNT (static charges) and negligible quantity of mercury (in blasting caps) Perchlorate (.50 caliber machine gun tracers)	**Soil** • Affected by lead projectiles on or within the ground.	**YES –** Complete or Potentially Complete Pathways →	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of soil particulates.	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of soil particulates.	• Potentially complete pathway. • Exposure routes: - ingestion, and - direct contact by area fauna.	• Analytical data do not exist. • Has landfill activity at Infiltration Range No. 143 removed or covered potentially affected soils?	• Composite soil samples will be analyzed for lead. Soil samples for lead will be sieved (#10 sieve) by the laboratory prior to analysis. • Explosives may be analyzed for samples from the location where static charges would be expected at Infiltration Range No. 143 (Infiltration Range No. 141 of Range Complex No. 4 is within the current National Guard exercise area and will not be inspected or sampled).
				NO – Incomplete Pathway					
			Surface Water /Sediment • Potentially affected (streams and ponds). • Fate & Transport: via surface runoff from impacted soil.	**YES –** Complete or Potentially Complete Pathways →	• Potentially complete pathway. • Exposure routes: - incidental ingestion, - dermal contact, and - inhalation of surface water.	• Potentially complete. • Exposure - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Potentially complete pathway. • Exposure routes: - ingestion, and - direct contact by area fauna.	• Analytical data do not exist.	• Impact to surface water will be addressed via primarily affected medium – soil. Locations of potential soil sources are known from historical maps. Will address surface water pathway with soil data; impact to surface water will conservatively be assumed if soil contamination is identified. • Surface water potentially impacted from the largest small arms range complex will be addressed by sampling sediment from surface water pathway for lead.
				NO – Incomplete Pathway					
			Groundwater • Potentially affected media. • Fate & Transport: migration to groundwater via infiltration.	**YES –** Complete, Potentially Complete, or Incomplete Pathways →	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of groundwater. particulates.	• Potentially complete—evidence of domestic wells within 2 miles. • Exposure routes: - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Incomplete pathway, no ecological access to groundwater.	• Analytical data do not exist.	• Impact to groundwater will be addressed via primarily affected medium – soil. • A groundwater sample will be collected at each of three small arms range complexes and analyzed for dissolved lead (+/- perchlorate).
				NO – Incomplete Pathway					
			Air • Not affected (non-volatile PCOCs)	Not Applicable (inhalation of particulates addressed via soil screening values).	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None

Table 2 (continued)
MEC and MC Exposure Pathway Analysis – Explosive Munitions Range

Range Area & Type	MMRP Concern	Potential Contaminant of Concern (PCOCs)	Affected Media (Potential Contaminant Sources) (Fate and Transport)	PCOC Concentrations Exceed Screening Levels	Exposure Routes and Potential Receptors			Data Gaps	Activities to Address Data Gaps (i.e., Sampling)
					Site Workers/ Contractor Personnel	Residents/ General Public	Ecological (Livestock & Biota)		
Explosive Munitions Ranges	**MEC**	MEC in the form of ***unexploded*** military munitions used at this site.	**Surface & Subsurface Soils** • Unexploded munitions are a hazard.	Not Applicable	• Complete pathway (MEC found). • Exposure routes: - Vehicle traffic - Foot traffic - Intrusive activities - Geologic instability	• Complete pathway (MEC found). • Exposure routes: - Vehicle traffic - Foot traffic - Intrusive activity - Geologic instability	• Complete pathway (MEC found). • Exposure routes: - Foot traffic - Burrowing - Geologic instability	• None—Presence of MEC is known from previous MEC encounters.	Visual reconnaissance and localized magnetometer sweeps will be conducted to: • Practice MEC avoidance, and • Select appropriate sample locations.
	MC	Explosives Metals Perchlorate	**Soil** • Incomplete detonation of explosive munitions.	**YES –** Complete or Potentially Complete Pathways →	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of soil particulates.	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of soil particulates.	• Potentially complete pathway. • Exposure routes: - ingestion, and - direct contact by area fauna.	• Analytical data do not exist.	• Composite soil samples will be analyzed for explosives and metals. Soil samples for metals will be sieved (#10 sieve) by the laboratory prior to analysis.
				NO – Incomplete Pathway					
			Surface Water /Sediment • Potentially affected (streams and ponds). • Fate & Transport: via surface runoff from impacted soil.	**YES –** Complete or Potentially Complete Pathways →	• Potentially complete pathway. • Exposure routes: - incidental ingestion, - dermal contact, and - inhalation of surface water.	• Potentially complete pathway. • Exposure routes: - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Potentially complete pathway • Exposure routes: - ingestion, and - direct contact by area fauna.	• Analytical data do not exist.	• Surface water potentially impacted from the explosive munitions ranges will be addressed by sampling sediment from surface water pathways for explosives and metals.
				NO – Incomplete Pathway					
			Groundwater • Potentially affected media. • Fate & Transport: migration to groundwater via infiltration.	**YES –** Complete, Potentially Complete, or Incomplete Pathways →	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of groundwater particulates.	• Potentially complete—evidence of domestic wells within 2 miles. • Exposure routes: - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Incomplete pathway for biota, no ecological access to groundwater. • Potentially complete pathway for livestock: - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Analytical data do not exist.	• Groundwater samples will be collected at each AOC and analyzed for explosives, dissolved metals, and perchlorate.
				NO – Incomplete Pathway					
			Air • Not affected (non-volatile PCOCs)	NA (inhalation of particulates addressed via soil screening values).	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None

Table 2 (continued)
MEC and MC Exposure Pathway Analysis – Live Hand Grenade Courts

Range Area & Type	MMRP Concern	Potential Contaminant of Concern (PCOCs)	Affected Media (Potential Contaminant Sources) (Fate and Transport)	PCOC Concentrations Exceed Screening Levels	Exposure Routes and Potential Receptors			Data Gaps	Activities to Address Data Gaps (i.e., Sampling)
					Site Workers/ Contractor Personnel	Residents/ General Public	Ecological (Livestock & Biota)		
Live Hand Grenade Court	**MEC**	MEC in the form of ***unexploded*** grenades used at this site.	**Surface & Subsurface Soils** • Unexploded grenades are a hazard.	Not Applicable	• Potentially complete pathway. • Exposure routes: - Vehicle traffic - Foot traffic - Intrusive activity - Geologic instability	• Potentially complete pathway. • Exposure routes: - Vehicle traffic - Foot traffic - Intrusive activities - Geologic instability	• Potentially complete pathway. • Exposure routes: - Foot traffic - Burrowing - Geologic instability	• The presence of MEC at West Live Hand Grenade Court is unknown.	Visual reconnaissance and localized magnetometer sweeps will be conducted to: • Assess presence of MEC (if not previously found), • Practice MEC avoidance, and • Select appropriate sample locations.
	MC	Explosives Metals	**Soil** • Incomplete detonation of explosive munitions	**YES –** Complete or Potentially Complete Pathways →	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of soil particulates.	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of soil particulates.	• Potentially complete pathway. • Exposure routes: - ingestion, and - direct contact by area fauna.	• Analytical data do not exist.	• One composite soil sample from each AOC will be analyzed for explosives and metals.
				NO – Incomplete Pathway					
			Surface Water/Sediment • Potentially affected (streams/ditches). • Fate & Transport: via surface runoff from impacted soil.	**YES –** Complete or Potentially Complete Pathways →	• Potentially complete pathway. • Exposure routes: - incidental ingestion, - dermal contact, and - inhalation of surface water.	• Potentially complete pathway. • Exposure routes: - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Potentially complete pathway. • Exposure routes: - ingestion, and - direct contact by area fauna.	• Analytical data do not exist.	• Impact to surface water will be addressed via primarily affected medium – soil. Locations of potential soil sources are known from historical maps. Will address surface water pathway with soil data; impact to surface water will conservatively be assumed if soil contamination is identified.
				NO – Incomplete Pathway					
			Groundwater • Potentially affected media. • Fate & Transport: migration to groundwater via infiltration.	**YES –** Complete or Potentially Complete Pathways →	• Potentially complete pathway. • Exposure routes (during intrusive work): - incidental ingestion, - dermal contact, and - inhalation of groundwater. particulates.	• Potentially complete—evidence of domestic wells within 2 miles. • Exposure - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Incomplete pathway, no ecological access to groundwater. • Potentially complete pathway for livestock: - ingestion, - dermal contact, and - inhalation of water mist or vapor.	• Analytical data do not exist.	• Impact to groundwater will be addressed via primarily affected medium – soil. Locations of potential soil sources are known from historical maps. Will address groundwater pathway with soil data; impact to surface water will conservatively be assumed if soil contamination is identified. • A ground water sample will be collected at one of the three live hand grenade court AOCs.
				NO – Incomplete Pathway					
			Air • Not affected (non-volatile PCOCs)	Not Applicable (inhalation of particulates addressed via soil screening values).	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None

Table 2 (continued)
MEC and MC Exposure Pathway Analysis – Practice Grenade Courts

Range Area & Type	MMRP Concern	Potential Contaminant of Concern (PCOCs)	Affected Media (Potential Contaminant Sources) (Fate and Transport)	PCOC Concentrations Exceed Screening Levels	Exposure Routes and Potential Receptors			Data Gaps	Activities to Address Data Gaps (i.e., Sampling)
					Site Workers/ Contractor Personnel	Residents/ General Public	Ecological		
Practice Grenade Courts	**MEC**	No indication of munitions being used at this AOC other than inert training grenades and practice grenades with small black powder charges.	**Surface & Subsurface Soils** • A mechanism by which explosive munitions would be present has not been identified.	Not Applicable	• Incomplete pathway.	• Incomplete pathway.	• Incomplete pathway.	None	None
	MC	No PCOCs in black powder.	**Soil** • Not Applicable	**NO –** Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None
			Surface Water/Sediment • Not Applicable	**NO –** Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None
			Air • Not Applicable	**NO –** Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None

Table 2 (continued)
MEC and MC Exposure Pathway Analysis – Chemical Identification Area No. 182

Range Area & Type	MMRP Concern	Potential Contaminant of Concern (PCOCs)	Affected Media (Potential Contaminant Sources) (Fate and Transport)	PCOC Concentrations Exceed Screening Levels	Exposure Routes and Potential Receptors			Data Gaps	Activities to Address Data Gaps (i.e., Sampling)
					Site Workers/ Contractor Personnel	Residents/ General Public	Ecological		
Chemical Identification Area No. 182	**MEC**	No indication of conventional munitions being used at this AOC. Small quantities of chemicals may have been used for training or demonstrations.	**Surface & Subsurface Soils** • A mechanism by which chemical or conventional munitions would be present has not been identified.	Not Applicable	• Incomplete pathway.	• Incomplete pathway.	• Incomplete pathway.	None	None
	MC	Mustard, lewisite, and other chemicals may have been used for training purposes (identification kits) or for demonstrations of decontamination procedures.	**Soil** • Chemicals used in training would generally not persist in soil and/or would be of negligible quantity.	**NO –** Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None
			Surface Water/Sediment • Unaffected per impact to soil described above.	**NO –** Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None
			Air • Unaffected per impact to soil described above.	**NO –** Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	Incomplete Pathway	None	None

Table 3
Proposed Sampling Approach
Camp Adair

No.	AOC	Number of Samples	Media to be Sampled			Contaminants of Concern									Survey for MEC	Comments
						Lead*			Selected Metals			Explosives		Perchlorate		
			Surface Soil	Sediment	Ground-water	Soil/Sed	TCLP	Water	Soil/Sed	TCLP	Water**	Soil/Sed	Water	Water		
1	Infiltration Range No. 143	2	2			2	TBD			TBD		2			Yes	Analysis to include explosives due to the use of static explosive charges.
2	Range Complex No. 4	10	8	1	1	9	TBD	1		TBD				1	Yes	
3	Range Complex No. 5	6	5		1	5	TBD	1		TBD				1	Yes	
4	Range Complex No. 6	5	4		1	4	TBD	1		TBD					Yes	
5	Skeet Range No. 580	3	3			3	TBD			TBD					No	No MEC risk associated with skeet range based on history of range use.
6	Range Complex No. 1	7	4	2	1		TBD		6	TBD	1	6	1	1	No	
7	Range Complex No. 2	11	7	2	2		TBD		9	TBD	2	9	2	2	No	Analysis to include explosives due to the use of static explosive charges.
8	Bombing Target No. 1	3	1	1	1		TBD		2	TBD	1	2	1	1	No	Perchlorate included because this AOC overlaps Range Complex No. 2.
9	Range Complex No. 3	6	4	1	1		TBD		5	TBD	1	5	1	1	No	
10	Mortar Range	4	2	1	1		TBD		3	TBD	1	3	1	1	No	
11	Moving Target Range No. 75	4	2	1	1		TBD		3	TBD	1	3	1	1	No	
12	East Live Grenade Court	1	1				TBD		1	TBD		1			No	
13	West Live Hand Grenade Court	1	1				TBD		1	TBD		1			No	
14	Live Hand Grenade Court No. 129	2	1	1			TBD		1	TBD	1	1	1		No	One groundwater sample to be collected from any of three live hand grenade court AOCs.
15	Practice Genade Courts (6 AOCs)	0					TBD			TBD					No	No field investigation required.
16	Chemical Identification Area No. 182	0					TBD			TBD					No	No field investigation required.
Environmental		**65**	**45**	**10**	**10**	**23**	**0**	**3**	**31**	**0**	**8**	**33**	**8**	**9**		
Field Duplicate						3	N/A	1	1	N/A	1	4	1	1		Minimum 10% goal
Field Split						3	N/A	1	1	N/A	1	4	1	1		Minimum 10% goal
Matrix Spike (MS)						2	N/A	0	1	N/A	1	2	1	1		Minimum 5% goal (solids & water)
MS Duplicate						2	N/A	0	1	N/A	1	2	1	1		Minimum 5% goal, (solids & water)
Equipment Blank						0	N/A	0	1	N/A	0	0	0	0		To be determined per sampling methods
Material Blank						0	N/A	0	0	N/A	0	0	0	0		No reagents
Quality Control Samples						**10**	**0**	**2**	**5**	**0**	**4**	**12**	**4**	**4**		
Total Samples to be analyzed						**33**	**0**	**5**	**36**	**0**	**12**	**45**	**12**	**13**		

AOC--Areas of Concern
Surface soil samples are composite samples (7-point, wheel pattern with 2-foot radius). All other samples are discrete grab samples.
In addition to the QC samples shown above, temperature blanks will be submitted with samples; one blank per cooler.
TBD --The need for leachate analyses will be discussed at the TPP meeting.
Lead and metals by SW846 6020. Explosives by SW846 8330A/Modified 8330A. Perchlorate by SW-846 6850.
* Analyses for lead will be performed on soil or sediment that has been passed through an ASTM No. 10 (2-mm) wire mesh sieve at the laboratory.
** Water samples for lead or metals analysis will be shipped to the laboratory without preservative; laboratory will filter the sample for analysis of dissolved metals.

Table 4
Human Health Screening Criteria for Soil/Sediment at Oregon Sites[a]

Analyte	Abbreviation	CAS No.	Region 9 Human Health Screening Values				Oregon DEQ Human Health Values			
			Residential PRG[b] (mg/kg)[b]	Industrial PRG[b] (mg/kg)	SSLs[c] DAF=1 (mg/kg)	SSLs[c] DAF=20 (mg/kg)	Soil Cleanup Level[d] (mg/kg)	Maximum Allowable Soil Conc. Residential[e] (mg/kg)	Maximum Allowable Soil Conc. Industrial[e] (mg/kg)	Leachate Conc.[f] (mg/L)
Hexahydro-1,3,5-trinitro-1,3,5-triazine	RDX	121-82-4	4.4	16						
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	HMX	2691-41-0	3,100	31,000						
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	16	57						
1,3,5-Trinitrobenzene	1,3,5-TNB	99-35-4	1,800	18,000						
1,3-Dinitrobenzene	1,3-DNB	99-65-0	6.1	62						
2,4-Dinitrotoluene[g]	2,4-DNT	121-14-2	0.72	2.5	0.00004	0.0008				
2,6-Dinitrotoluene[g]	2,6-DNT	606-20-2	0.72	2.5	0.00004	0.0008	0.002	1	8	0.00009
2-Amino-4,6-dinitrotoluene	2-Am-DNT	35572-78-2	12	120						
2-Nitrotoluene	2-NT	88-72-2	0.88	2.2						
3-Nitrotoluene	3-NT	99-08-1	730	1,000						
4-Amino-2,6-dinitrotoluene	4-Am-DNT	19406-51-0	12	120						
4-Nitrotoluene	4-NT	99-99-0	12	30						
Nitrobenzene	NB	98-05-3	20	100	0.007	0.1				
Nitroglycerin	NG	55-63-0	35	120						
Methyl-2,4,6-trinitrophenylnitramine	Tetryl	479-45-8	610	6,200						
Pentaeryltritol tetranitrate	PENT	78-11-5								
Aluminum	Al	7429-90-5	76,000	100,000						
Antimony	Sb	7440-36-0	31	410	0.30	5				
Arsenic	As	7440-38-2	0.39	1.6	1	29	0.004	0.4	3	0.004
Barium	Ba	7440-38-2	5,400	67,000	82	1,600	100	20,000	140,000	100
Beryllium	Be	7440-41-7	150	1,900	3	63	0.002	0.1	1	0.002
Cadmium	Cd	7440-43-9	37	450	0.4	8	0.5	100	1,000	0.5
Calcium	Ca	7440-70-2								
Chromium[h]	Cr	7440-47-3	210	450	2	38	10	1,000	1,500	10
Cobalt	Co	7440-48-4	900	1,900						
Copper	Cu	7440-50-8	3,100	41,000			100	10,000	80,000	100
Iron	Fe	7439-89-6	23,000	100,000						
Lead	Pb	7439-92-1	400	800			2	200	2,000	2
Magnesium	Mg	7439-95-4								
Manganese	Mn	7439-96-5	1,800	19,000			400	30,000	200,000	400
Molybdenum	Mo	7439-98-7	390	5,100						
Nickel	Ni	7440-02-0	1,600	20,000	7	130	10	5,000	40,000	10
Potassium	K	7440-09-7								
Selenium	Se	7782-49-2	390	5,100	0.3	5				
Silver	Ag	7440-22-4	390	5,100	2	34	5	1,500	10,000	5
Sodium	Na	7440-23-5								
Strontium	Sr	7440-24-6	47,000	100,000						
Thallium	Tl	7440-28-0	5.2	67						
Titanium	Ti	7440-32-6	100,000	100,000						
Vanadium	V	7440-62-2	78	1,000	300	6,000				
Zinc	Zn	7440-66-6	23,000	100,000	620	12,000				
Zirconium	Zr	7440-67-7								
Mercury	Hg	7439-97-6	23	310			0.2	80	600	0.2

Table 4
Human Health Screening Criteria for Soil/Sediment at Oregon Sites[a]

Analyte	Abbreviation	CAS No.	Region 9 Human Health Screening Values				Oregon DEQ Human Health Values			
			Residential PRG[b] (mg/kg)[b]	Industrial PRG[b] (mg/kg)	SSLs[c] DAF=1 (mg/kg)	SSLs[c] DAF=20 (mg/kg)	Soil Cleanup Level[d] (mg/kg)	Maximum Allowable Soil Conc. Residential[e] (mg/kg)	Maximum Allowable Soil Conc. Industrial[e] (mg/kg)	Leachate Conc.[f] (mg/L)
Phosphorus (white)	WP or P_4	7723-14-0	1.6	20						
Perchlorate	$C1O_4$	14797-73-0	7.8	100						
Acenaphthene		83-32-0	3,700	29,000	29	570	2,000	20,000	100,000	60
Acenaphthylene[i]		120-12-7	2,300	29,000						
Anthracene		120-12-7	22,000	100,000	590	12,000	20,000	80,000	600,000	700
Benzo(a)anthracene		56-55-3	0.62	2.1	0.08	2	0.1	0.1	1	0.002
Benzo(b)fluoranthene		205-99-2	0.62	2.1	0.2	5	0.1	0.1	1	0.002
Benzo(k)fluoranthene		207-08-9	6.2	21	2	49	0.1	0.1	1	0.002
Benzo(g,h,i)perylene[i]			2,300	29,000						
Benzo(a)pyrene		50-32-8	0.062	0.21	0.4	8	0.1	0.1	1	0.002
Chrysene		218-01-9	62	210	8	160	0.1	0.1	1	0.002
Dibenz(a)anthracene		53-70-3	0.062	0.21	0.08	2	0.1	0.1	1	0.002
Fluoranthene		206-40-0	2,300	22,000	210	4,300	8,000	10,000	80,000	60
Fluorene		86-73-7	2,700	26,000	28	560	2,000	10,000	80,000	100
Indeno(1,2,3-cd)pyrene		139-39-5	0.62	2.1	0.7	14	0.1	0.1	1	0.002
Naphthalene		91-20-3	56	190	4	84	30	1,000	8,000	1
Phenanthrene[i]			2,300	29,000						
Pyrene		129-00-0	2,300	29,000	210	4,200	6,000	8,000	60,000	100
Nitrobenzene-d5										
2-Fluorobiphenyl										
Terphenyl-dl4										

DAF = Dilution Attenuation Factor
PRG = Preliminary Remediation Goal
SSL = Soil Screening Level

mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.

[a] If laboratory cannot meet any of the preferred QLs with routine SW 846 methodology (as supported by MDLs that are no greater than 1/3 QL), laboratory's QL must be identified in laboratory submittal as failing to meet the QL. Some screening values cannot be obtained with routine methodology to the QL. In those cases, the QL achievable with a routine SW 846 methodology would be accepted.

[b] PRGs from Region 9 PRG Table dated October 2004 and addendum dated 28 December 2004, based on single chemical.

[c] SSLs from Region 9 PRG Table dated October 2004 and revision note dated 28 December 2004.

[d] Soil cleanup levels from Oregon DEQ Hazardous Substance Remedial Action Rules, dated 27 July 2000. OAR 340-122-045(1) through (5), Table 1.

[e] Concentrations from Oregon DEQ Hazardous Substance Remedial Action Rules, dated 27 July 2000. OAR 340-122-045(7), Appendix 1.

[f] Concentrations from Oregon DEQ Hazardous Substance Remedial Action Rules, dated 27 July 2000. OAR 340-122-045(6)(a), Appendix 1.

[g] Carconogenic DNT mixture values used if more conservative than noncarcinogenic isomer-specific values.

[h] Total chromium values used.

[i] Based on PRG for pyrene as a surrogate value.

Table 5

Human Health Screening Criteria for Groundwater at Oregon Sites[a]

			Region 9 Tap Water PRG[b] (µg/L)	Federal Drinking Water Criteria MCLs[c] (mg/L)	Oregon DEQ Numerical Groundwater Quality Reference Levels[d] (µg/L)
Hexahydro-1,3,5-trinitro-1,3,5-triazine	RDX	121-82-4	0.61		
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	HMX	2691-41-0	1,800		
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	2.2		
1,3,5-Trinitrobenzene	1,3,5-TNB	99-35-4	1,100		
1,3-Dinitrobenzene	1,3-DNB	99-65-0	3.6		
2,4-Dinitrotoluene[e]	2,4-DNT	121-14-2	0.099		
2,6-Dinitrotoluene[e]	2,6-DNT	606-20-2	0.099		
2-Amino-4,6-dinitrotoluene	2-Am-DNT	35572-78-2	7.3		
2-Nitrotoluene	2-NT	88-72-2	0.049		
3-Nitrotoluene	3-NT	99-08-1	120		
4-Amino-2,6-dinitrotoluene	4-Am-DNT	19406-51-0	7.3		
4-Nitrotoluene	4-NT	99-99-0	0.66		
Nitrobenzene	NB	98-05-3	3.4		
Nitroglycerin	NG	55-63-0	4.8		
Methyl-2,4,6-trinitrophenylnitramine	Tetryl	479-45-8	360		
Pentaeryltritol tetranitrate	PETN	78-11-5			
Aluminum	Al	7429-90-5	36,000	50[f]	
Antimony	Sb	7440-36-0	15	6	
Arsenic	As	7440-38-2	0.045	10	50
Barium	Ba	7440-38-2	2,600	2,000	1,000
Beryllium	Be	7440-41-7	73	4	
Cadmium	Cd	7440-43-9	18	5	10
Calcium	Ca	7440-70-2			
Chromium[f]	Cr	7440-47-3	110	100	50
Cobalt	Co	7440-48-4	730		
Copper	Cu	7440-50-8	1,500	1,000[f] 1,300[u]	1,000[i]
Iron	Fe	7439-89-6	11,000	300[f]	300[i]
Lead	Pb	7439-92-1		15[h]	50
Magnesium	Mg	7439-95-4			
Manganese	Mn	7439-96-5	880	50[f]	50[i]
Mercury	Hg	7439-97-6	11	2	2
Molybdenum	Mo	7439-98-7	180		
Nickel	Ni	7440-02-0	730		
Potassium	K	7440-09-7			
Selenium	Se	7782-49-2	180	50	10
Silver	Ag	7440-22-4	180	100[f]	50
Sodium	Na	7440-23-5		20,000[j]	
Strontium	Sr	7440-24-6	22,000		
Thallium	Tl	7440-28-0	2.4	2	

Table 5

Human Health Screening Criteria for Groundwater at Oregon Sites[a]

			Region 9 Tap Water PRG[b] (µg/L)	Federal Drinking Water Criteria MCLs[c] (mg/L)	Oregon DEQ Numerical Groundwater Quality Reference Levels[d] (µg/L)
Titanium	Ti	7440-32-6	150,000		
Vanadium	V	7440-62-2	36		
Zinc	Zn	7440-66-6	11,000	5,000[f]	5,000[i]
Zirconium	Zr	7440-67-7			
Phosphorus (white)	WP or P_4	7723-14-0	0.73		
Perchlorate	$C1O_4$	7601-90-3	3.6		
Acenaphthene		83-32-0	370		
Acenaphthylene[f]		120-12-7			
Anthracene		120-12-7	1,800		
Benzo(a)anthracene		56-55-3	0.092		
Benzo(b)fluoranthene		205-99-2	0.092		
Benzo(k)fluoranthene		207-08-9	0.92		
Benzo(g,h,i)perylene[f]			180		
Benzo(a)pyrene		50-32-8	0.0092	0.0002	
Chrysene		218-01-9	9.2		
Dibenz(a)anthracene		53-70-3	0.0092		
Fluoranthene		206-40-0	1,500		
Fluorene		86-73-7	240		
Indeno(1,2,3-cd)pyrene		139-39-5	0.092		
Naphthalene		91-20-3	2.6		
Phenanthrene[f]			180		
Pyrene		129-00-0	180		
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-dl4					

MCL = Maximum Contaminant Level
PRG = Preliminary Remediation Goal
µg/L = micrograms per liter

[a] If laboratory cannot meet these QLs with routine SW 846 methodology (as supported by MDLs that are no greater than 1/3 QL), laboratory's QL must be identified in laboratory submittal as failing to meet the QL. Some screening values cannot be obtained with routine methodology to the QL.
Note that no surface water samples are planned at this time. If surface water is collected, additional human health screening criteria will be compiled.
[b] Region 9 PRG Table dated October 2004 and revision note dated 28 December 2004, based on single chemical.
[c] Primary MCL from the 2004 Edition of the Drinking Water Standards and Health Advisories, dated Winter 2004, is listed unless otherwise indicated.
[d] Values from OAR 340-40-020, Table 1, dated November 1997.
[e] Carcinogenic DNT mixture values used if more conservative than noncarcinogenic isomer-specific values.
[f] Secondary MCL from the 2004 Edition of the Drinking Water Standards and Health Advisories, dated Winter 2004.
[g] Total chromium values used if available.
[h] Action level from the 2004 Edition of the Drinking Water Standards and Health Advisories, dated Winter 2004.
[i] Numerical Groundwater Quality Guidance Level from OAR 340-40-020, Table 3, dated November 1997.
[j] Value from the 2004 Edition of the Drinking Water Standards and Health Advisories, dated Winter 2004, Drinking Water Advisory Table.

Table 6
Selection of Ecological Soil Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Parameter	ODEQ Level II Screening Level [a]	Proposed Benchmarks									Potential Bioaccumulative Constituent? [h]	Final Ecological Screening Value Soil [i]	Practical Quantitation Limit
	Lowest Value for Plants/Inverts./ Birds/Mammals (mg/kg)	Region 5 ESLs [b] (2003) (mg/kg)	Region 7 [c] (mg/kg)		Region 8 [d] (mg/kg)		Region 10 [e] (mg/kg)		Other Values: Talmage et al. (1999) [f] or LANL (2005) [g] (mg/kg)			(mg/kg)	(mg/kg)
Metals/Inorganics													
Aluminum	50	NVA	50	EPA-R4	NVA		50	EPA-R4	5.5	LANL		50	20.0
Antimony	5	0.142	0.27	SSL	0.27	SSL	0.27	SSL	0.05	LANL	Yes	5	0.5
Arsenic	10	5.7	18	SSL	18	SSL	18	SSL	6.8	LANL	Yes	10	0.6
Barium	85	1.04	330	SSL	330	SSL	330	SSL	110	LANL		85	0.5
Beryllium	10	1.06	21	SSL	21	SSL	21	SSL	2.5	LANL	Yes	10	0.4
Cadmium	4	0.00222	0.36	SSL	0.36	SSL	0.36	SSL	0.27	LANL	Yes	4	0.5
Calcium	NVA	NVA	NVA		NVA		NVA		NVA			NVA/Nutrient	100.0
Chromium (total)	0.4	0.4	26	SSL	26	SSL	26	SSL	2.3	LANL	Yes	0.4	1.0
Cobalt	20	0.14	13	SSL	13	SSL	13	SSL	13	LANL		20	0.5
Copper	50	5.4	60	ORNL	190	Dutch	60	ORNL	10	LANL	Yes	50	1.0
Iron	10	NVA	200	EPA-R4	NVA		200	EPA-R4	NVA			10	15.0
Lead	16	0.0537	11	SSL	11	SSL	11	SSL	14	LANL	Yes	16	1.0
Magnesium	NVA	NVA	440000	EPA-R4	NVA		440000	EPA-R4	NVA			NVA/Nutrient	25.0
Manganese	100	NVA	100	EPA-R4	NVA		100	EPA-R4	50	LANL		100	0.5
Mercury	0.1	0.1	0.00051	ORNL	0.00051	ORNL	0.00051	ORNL	0.013	LANL	Yes	0.1	0.06
Molybdenum	2	NVA	2	ORNL	2	ORNL	2	ORNL	NVA			2	0.5
Nickel	30	13.6	30	ORNL	30	ORNL	30	ORNL	20	LANL	Yes	30	1.0
Perchlorate	NVA	NVA	NVA		NVA		NVA		NVA			NVA	
Phosphorus (white)	NVA	NVA	NVA		NVA		NVA		NVA			NVA	
Potassium	NVA	NVA	NVA		NVA		NVA		NVA			NVA/Nutrient	25.0
Selenium	1	0.0276	0.21	ORNL	0.21	ORNL	0.21	ORNL	0.1	LANL	Yes	1	2.0
Silver	2	4.04	2	ORNL	2	ORNL	2	ORNL	0.05	LANL	Yes	2	0.3
Sodium	NVA	NVA	NVA		NVA		NVA		NVA			NVA/Nutrient	250.0
Strontium	32875	NVA	NVA		NVA		NVA		96	LANL		32875	
Thallium	1	0.0569	1	ORNL	1	ORNL	1	ORNL	0.032	LANL	Yes	1	0.5
Titanium	1000	NVA	NVA		NVA		NVA		72	LANL		1000	
Vanadium	2	1.59	7.8	SSL	7.8	SSL	7.8	SSL	0.025	LANL		2	15.0
Zinc	50	6.62	8.5	ORNL	8.5	ORNL	8.5	ORNL	10	LANL	Yes	50	2.0
Zirconium	97	NVA	NVA		NVA		NVA		NVA			97	
PAHs													
1-Methylnaphthalene	NVA	NVA	NVA		NVA		NVA		NVA			2.5 (surrogate)	0.015
2-Methylnaphthalene	NVA	3.24	NVA		NVA		NVA		2.5	LANL		2.5	0.015
Acenaphthene	20	682	20	ORNL	20	ORNL	20	ORNL	0.25	LANL	Yes	20	0.015
Acenaphthylene	NVA	682	682	EPA-R4	NVA		682	EPA-R4	120	LANL	Yes	682	0.015
Anthracene	NVA	1480	0.1	EPA-R4	NVA		0.1	EPA-R4	210	LANL	Yes	0.1	0.015
Benzo(a)anthracene	NVA	5.21	5.21	EPA-R4	NVA		5.21	EPA-R4	3.0	LANL	Yes	5.21	0.015
Benzo(a)pyrene	125	1.52	0.1	EPA-R4	NVA		0.1	EPA-R4	9.6	LANL	Yes	125	0.015
Benzo(b)fluoranthene	NVA	59.8	59.8	EPA-R4	NVA		59.8	EPA-R4	18	LANL	Yes	59.8	0.015
Benzo(k)fluoranthene	NVA	148	148	EPA-R4	NVA		148	EPA-R4	62	LANL	Yes	148	0.015
Benzo(g,h,i)perylene	NVA	119	119	EPA-R4	NVA		119	EPA-R4	24	LANL	Yes	119	0.015
Chrysene	NVA	4.73	4.73	EPA-R4	NVA		4.73	EPA-R4	2.4	LANL	Yes	4.73	0.015
Dibenz(a,h)anthracene	NVA	18.4	18.4	EPA-R4	NVA		18.4	EPA-R4	12	LANL	Yes	18.4	0.015
Dibenzofuran	0.002	NVA	NVA		NVA		NVA		6.1	LANL		0.002	0.015
Fluoranthene	NVA	122	0.1	EPA-R4	NVA		0.1	EPA-R4	22	LANL	Yes	0.1	0.015
Fluorene	30	122	122	EPA-R4	NVA		122	EPA-R4	4.1	LANL	Yes	30	0.015
Indeno(1,2,3-cd)pyrene	NVA	109	109	EPA-R4	NVA		109	EPA-R4	62	LANL	Yes	109	0.015
Naphthalene	10	0.0994	0.1	EPA-R4	NVA		0.1	EPA-R4	0.34	LANL		10	0.015
Phenanthrene	NVA	45.7	0.1	EPA-R4	NVA		0.1	EPA-R4	10	LANL	Yes	0.1	0.015
Pyrene	NVA	78.5	0.1	EPA-R4	NVA		0.1	EPA-R4	18	LANL	Yes	0.1	0.015

Table 6
Selection of Ecological Soil Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Parameter	ODEQ Level II Screening Level [a]	Proposed Benchmarks									Potential Bioaccumulative Constituent? [h]	Final Ecological Screening Value Soil [i]	Practical Quantitation Limit
	Lowest Value for Plants/Inverts./ Birds/Mammals (mg/kg)	Region 5 ESLs [b] (2003) (mg/kg)	Region 7 [c] (mg/kg)		Region 8 [d] (mg/kg)		Region 10 [e] (mg/kg)		Other Values: Talmage et al. (1999) [f] or LANL (2005) [g] (mg/kg)			(mg/kg)	(mg/kg)
Explosive													
2,4-Dinitrotoluene	NVA	1.28	1.28	EPA-R4	NVA		1.28	EPA-R4	0.52	LANL		1.28	0.040
2,6-Dinitrotoluene	NVA	0.0328	0.0328	EPA-R4	NVA		0.0328	EPA-R4	0.37	LANL		0.0328	0.040
2-Amino-4,6-Dinitrotoluene	NVA	NVA	NVA		NVA		NVA		2.1	LANL		2.1	0.040
4-Amino-2,6-Dinitrotoluene	NVA	NVA	NVA		NVA		NVA		0.73	LANL		0.73	0.040
1,3-Dinitrobenzene	NVA	0.655	0.655	EPA-R4	NVA		0.655	EPA-R4	0.073	LANL		0.655	0.020
HMX	NVA	NVA	NVA		NVA		NVA		27	LANL		27	0.050
Nitrobenzene	8	1.31	1.31	EPA-R4	NVA		1.31	EPA-R4	2.2	LANL		8	0.020
RDX	NVA	NVA	NVA		NVA		NVA		7.5	LANL		7.5	0.075
1,3,5-Trinitrobenzene	NVA	0.376	0.376	EPA-R4	NVA		0.376	EPA-R4	6.6	LANL		0.376	0.020
2,4,6-Trinitrotoluene	NVA	NVA	NVA		NVA		NVA		6.4	LANL		6.4	0.040
2-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		2.0	LANL		2.0	0.075
3-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		2.4	LANL		2.4	0.050
4-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		4.4	LANL		4.4	0.040
Nitroglycerin	NVA	NVA	NVA		NVA		NVA		71	LANL		71	10
Tetryl	NVA	NVA	NVA		NVA		NVA		0.99	LANL		0.99	0.065
PETN	NVA	NVA	NVA		NVA		NVA		8600	LANL		8600	0.50

NVA: No value available

[a] Oregon Department of Environmental Quality Screening Level Values (December 2001).

[b] Ecological Screening Levels (ESLs), U.S.EPA Region V, August 2003.

[c] USEPA Region 7: Catherine Wooster-Brown (Eco Risk Assessor) recommends the following hierarchy: USEPA EcoSSLs; ORNL Effroymson values; USEPA Region 4 values; other published values.

[d] USEPA Region 8: Dale Hoff (Eco Risk Assessor) recommends the following hierarchy: USEPA SSLs; Dutch Intervention Values or ORNL Effroymson values.

[e] USEPA Region 10: Joseph Goulet (Eco Risk Assessor) says Region 10 has no recommended hierarchy, therefore, values from the USEPA Region 7 Approach were used.

[f] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel, 1999, Nitroaromatic Munition Compounds: Environmental Effects and Screening Values, **Rev. Environ. Contam. Toxicol.**

[g] Los Alamos National Laboratory (LANL), Eco Risk Database, Release 2.2, September 2005.

[h] Potential bioaccumulative constituents will be evaluated in more detail, as some screening values do not take into account bioaccumulation.
Potential bioaccumulative potential from: B*ioaccumulation and Interpretation for the Purposes of Sediment Quality Assessment: Status and Needs* (USEPA, 2000) and ODEQ EQSLVs (ODEQ, 2001).

[i] Final Screening Value selected using the following hierarchy:
1. State Value (Oregon)
2. USEPA Region State Located In (USEPA Region 10)
3. Lower of Talmage et al. (1999) or LANL (2005) values.

EPA-R4=USEPA Region 4
LANL= Los Alamos National Laboratory
SSL=USEPA Eco Soil Screening Levels
Dutch=Dutch Intervention Values
ORNL= Oak Ridge National Laboratory Ecological PRGs (Efroymson et al)

Other References:

U.S. Environmental Protection Agency, 2005, *Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs)* , Office of Solid Waste and Emergency Response, Website version last updated March 15, 2005: http://www.epa.gov/ecotox/ecossl.

U.S. Environmental Protection Agency, 2001, *Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment* . Originally published November 1995. Website version last updated November 30, 2001: http://www.epa.gov/region4/waste/ots/ecolbul.htm.

Efroymson, R.A., Suter II, G.W., Sample, B.E. and Jones, D.S., 1997. Preliminary Remediation Goals for Ecological Endpoints. Lockheed Martin Energy Systems, Inc. (ORNL) ES/ER/TM-162/R2.

Dutch Intervention Values:

Swartjes, F.A. 1999. R*isk-based Assessment of Soil and Groundwater Quality in the Netherlands: Standards and Remediation Urgency* . Risk Analysis 19(6): 1235-1249

The Netherlands Ministry of Housing, Spatial Planning and Environment's Circular on target values and intervention values for soil remediation http://www2.minvrom.nl/Docs/internationaal/S_I2000.pdf and Annex A: Target Values, Soil Remediation Intervention Values and Indicative Levels for Serious Contamination http://www2.minvrom.nl/Docs/internationaal/annexS_I2000.pdf were also consulted.

Table 7
Selection of Ecological Surface Water Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Parameter	ODEQ Screening Level Values[a] (mg/L) Freshwater	Region 5 Ecological Screening Levels[b] (mg/L)	EPA Region 7 [c] (mg/L)		EPA Region 8 [d] (mg/L)		EPA Region 10 [e] (mg/L)		Other Ecological Screening Values[f] (mg/L)		Potential Bioaccumulative Constituent? [g]	Final Ecological Value Surface Water [h] (mg/L)	Practical Quantitation Limit (mg/L)
Metals/Inorganics													
Aluminum	8.70E-02	NVA	8.70E-02	AWQC	8.70E-02	AWQC	8.70E-02	AWQC	8.70E-02	LANL		8.70E-02	6.0E-02
Antimony	1.00E+00	8.00E-02	3.00E-02	EPRG	3.00E-02	Tier II	3.00E-02	EPRG	1.00E-01	LANL	Yes	1.00E+00	1.0E-03
Arsenic	1.50E-01	1.48E-01	1.50E-01	AWQC	1.50E-01	AWQC	1.50E-01	AWQC	1.50E-01	LANL	Yes	1.50E-01	1.5E-03
Barium	4.00E-03	2.20E-01	4.00E-03	EPRG	4.00E-03	Tier II	4.00E-03	EPRG	3.80E-03	LANL		4.00E-03	5.0E-03
Beryllium	5.30E-03	3.60E-03	6.60E-04	EPRG	6.60E-04	Tier II	6.60E-04	EPRG	5.30E-03	LANL	Yes	5.30E-03	2.0E-04
Cadmium	2.20E-03	1.50E-04	2.50E-04	AWQC	2.50E-04	AWQC	2.50E-04	AWQC	1.50E-04	LANL	Yes	2.20E-03	5.0E-04
Calcium	1.16E+02	NVA	NVA		NVA		NVA		NVA			1.16E+02	1.0E+00
Chromium (Cr-III)	7.40E-02	4.20E-02	7.40E-02	AWQC	7.40E-02	AWQC	7.40E-02	AWQC	7.70E-02	LANL	Yes	7.40E-02	2.0E-03
Cobalt	2.30E-02	2.40E-02	2.30E-02	EPRG	2.30E-02	Tier II	2.30E-02	EPRG	3.00E-03	LANL		2.30E-02	1.0E-03
Copper	9.00E-03	1.58E-03	9.00E-03	AWQC	9.00E-03	AWQC	9.00E-03	AWQC	5.00E-03	LANL	Yes	9.00E-03	3.0E-03
Iron	1.00E+00	NVA	1.00E+00	AWQC	1.00E+00	AWQC	1.00E+00	AWQC	1.00E+00	LANL		1.00E+00	5.0E-02
Lead	2.50E-03	1.17E-03	2.50E-03	AWQC	2.50E-03	AWQC	2.50E-03	AWQC	1.20E-03	LANL	Yes	2.50E-03	1.0E-03
Magnesium	8.20E+01	NVA	NVA		NVA		NVA		NVA			8.20E+01	1.0E-01
Manganese	1.20E-01	NVA	1.20E-01	EPRG	1.20E-01	Tier II	1.20E-01	EPRG	8.00E-02	LANL		1.20E-01	2.0E-03
Mercury	7.70E-04	1.30E-06	7.70E-01	AWQC	7.70E-01	AWQC	7.70E-01	AWQC	7.70E-04	LANL	Yes	7.70E-04	3.0E-04
Molybdenum	3.70E-01	NVA	3.70E-01	EPRG	3.70E-01	Tier II	3.70E-01	EPRG	NVA			3.70E-01	5.0E-03
Nickel	5.20E-02	2.89E-02	5.20E-02	AWQC	5.20E-02	AWQC	5.20E-02	AWQC	2.80E-02	LANL	Yes	5.20E-02	1.0E-03
Perchlorate	NVA	NVA	NVA		NVA		NVA		3.50E+01	LANL		3.50E+01	
Phosphorus (white)	NVA	NVA	NVA		NVA		NVA		NVA			NVA	
Potassium	5.30E+01	NVA	NVA		NVA		NVA		NVA			5.30E+01	1.0E+00
Selenium	5.00E-03	5.00E-03	5.00E-03	AWQC	5.00E-03	AWQC	5.00E-03	AWQC	5.00E-03	LANL	Yes	5.00E-03	2.0E-03
Silver	1.20E-04	1.20E-04	3.60E-04	EPRG	3.60E-04	Tier II	3.60E-04	EPRG	3.60E-04	LANL	Yes	1.20E-04	1.5E-04
Sodium	6.80E+02	NVA	NVA		1.00E-02	CCME	NVA		NVA			6.80E+02	1.0E+00
Strontium	1.50E+00	NVA	1.50E+00	EPRG	1.50E+00	Tier II	1.50E+00	EPRG	6.20E-01	LANL		1.50E+00	
Thallium	4.00E-02	1.00E-02	9.00E-03	EPRG	1.20E-02	Tier II	9.00E-03	EPRG	1.80E-02	LANL	Yes	4.00E-02	1.0E-03
Titanium	NVA	NVA	NVA		NVA		NVA		7.00E+01	LANL		7.00E+01	
Vanadium	2.00E-02	1.20E-02	2.00E-02	EPRG	2.00E-02	Tier II	2.00E-02	EPRG	1.90E-02	LANL		2.00E-02	5.0E-03
Zinc	1.20E-01	6.57E-02	1.20E-01	AWQC	1.20E-01	AWQC	1.20E-01	AWQC	6.60E-02	LANL	Yes	1.20E-01	1.0E-02
Zirconium	1.70E-02	NVA	1.70E-02	EPRG	1.70E-02	Tier II	1.70E-02	EPRG	NVA			1.70E-02	
PAHs													
1-Methylnaphthalene	2.10E-03	NVA	NVA		2.10E-03	Tier II	NVA		NVA			2.10E-03	2.0E-04
2-Methylnaphthalene	NVA	3.30E-01	NVA		NVA		NVA		2.00E-03	LANL		2.00E-03	2.0E-04
Acenaphthene	5.20E-01	3.80E-02	2.30E-02	EPRG	5.80E-03	CCME	2.30E-02	EPRG	2.30E-02	LANL	Yes	5.20E-01	2.0E-04
Acenaphthylene	NVA	4.84E+00	NVA		NVA		NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04
Anthracene	1.30E-02	3.50E-05	7.30E-04	EPRG	7.30E-04	Tier II	7.30E-04	EPRG	1.30E-06	LANL	Yes	1.30E-02	2.0E-04
Benzo(a)anthracene	2.70E-05	2.50E-05	2.70E-05	EPRG	2.70E-05	Tier II	2.70E-05	EPRG	2.70E-05	LANL	Yes	2.70E-05	2.0E-04
Benzo(a)pyrene	1.40E-05	1.40E-05	1.40E-05	EPRG	1.40E-05	Tier II	1.40E-05	EPRG	1.40E-05	LANL	Yes	1.40E-05	2.0E-04
Benzo(b)fluoranthene	NVA	9.07E-03	NVA		NVA		NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04
Benzo(k)fluoranthene	NVA	NVA	NVA		NVA		NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04
Benzo(g,h,i)perylene	NVA	7.64E-03	NVA		NVA		NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04
Chrysene	NVA	NVA	NVA		NVA		NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04
Dibenz(a,h)anthracene	NVA	NVA	NVA		NVA		NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04
Dibenzofuran	3.70E-03	4.00E-03	3.70E-03	EPRG	3.70E-03	Tier II	3.70E-03	EPRG	NVA			3.70E-03	2.0E-04
Fluoranthene	6.16E-03	1.90E-03	6.20E-03	EPRG	4.00E-05	CCME	6.20E-03	EPRG	6.10E-03	LANL	Yes	6.16E-03	2.0E-04
Fluorene	3.90E-03	1.90E-02	3.90E-03	EPRG	3.90E-03	Tier II	3.90E-03	EPRG	3.90E-03	LANL	Yes	3.90E-03	2.0E-04
Indeno(1,2,3-cd)pyrene	NVA	4.31E-03	NVA		NVA		NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04
Naphthalene	6.20E-01	1.30E-02	1.20E-02	EPRG	1.20E-02	Tier II	1.20E-02	EPRG	2.30E-02	LANL		6.20E-01	2.0E-04
Phenanthrene	6.30E-03	3.60E-03	6.30E-03	EPRG	4.00E-04	CCME	6.30E-03	EPRG	6.30E-03	LANL	Yes	6.30E-03	2.0E-04
Pyrene	NVA	3.00E-04	NVA		2.50E-05	CCME	NVA		3.00E-02	LANL	Yes	3.00E-02	2.0E-04

Table 7
Selection of Ecological Surface Water Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Parameter	ODEQ Screening Level Values[a] (mg/L) Freshwater	Region 5 Ecological Screening Levels[b] (mg/L)	EPA Region 7 [c] (mg/L)		EPA Region 8 [d] (mg/L)		EPA Region 10 [e] (mg/L)		Other Ecological Screening Values[f] (mg/L)		Potential Bioaccumulative Constituent? [g]	Final Ecological Value Surface Water [h] (mg/L)	Practical Quantitation Limit (mg/L)
Explosives													
RDX	NVA	NVA	NVA		NVA		NVA		1.90E-01	TAL		1.90E-01	8.0E-04
HMX	NVA	NVA	NVA		NVA		NVA		3.30E-01	TAL		3.30E-01	4.0E-04
1,3-Dinitrobenzene	NVA	2.20E-02	NVA		NVA		NVA		2.00E-02	TAL		2.00E-02	2.0E-04
1,3,5-Trinitrobenzene	NVA	NVA	NVA		NVA		NVA		1.00E-02	TAL		1.00E-02	2.0E-04
2-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		8.00E+00	LANL		8.00E+00	4.0E-04
3-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		9.60E+00	LANL		9.60E+00	8.0E-04
4-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		1.70E+01	LANL		1.70E+01	4.0E-04
2,4-Dinitrotoluene	2.30E-01	4.40E-02	NVA		NVA		NVA		3.10E-01	LANL		2.30E-01	3.0E-04
2,6-Dinitrotoluene	2.30E-01	8.10E-02	NVA		NVA		NVA		6.00E-02	LANL		2.30E-01	3.0E-04
2-Amino,4,6-Dinitrotoluene	NVA	NVA	NVA		NVA		NVA		2.00E-02	TAL		2.00E-02	2.0E-04
4-Amino-2,6-Dinitrotoluene	NVA	NVA	NVA		NVA		NVA		8.60E+00	LANL		8.60E+00	2.0E-04
2,4,6-Trinitrotoluene	NVA	NVA	NVA		NVA		NVA		9.00E-02	TAL		9.00E-02	3.0E-04
Nitrobenzene	5.40E-01	2.20E-01	NVA		NVA		NVA		2.70E-01	LANL		5.40E-01	2.0E-04
Nitroglycerin	NVA	NVA	NVA		NVA		NVA		4.30E+02	LANL		4.30E+02	5.0E-02
PETN	NVA	NVA	NVA		NVA		NVA		2.60E+04	LANL		2.60E+04	1.3E-03
Tetryl	NVA	NVA	NVA		NVA		NVA		5.80E+00	LANL		5.80E+00	7.5E-04

NVA = No Value Available

[a] Oregon Department of Environmental Quality Screening Level Values (December 2001).

[b] Ecological Screening Levels (ESLs), U.S.EPA Region 5, August 2003.

[c] USEPA Region 7: Catherine Wooster-Brown (Eco Risk Assessor) recommends the following hierarchy: National Ambient Water Quality Criteria; ORNL Effroymson values (ORNL, 1977).

[d] USEPA Region 8: Dale Hoff (Eco Risk Assessor) recommends the following hierarchy: National Ambient Water Quality Criteria; Great Lakes Tier II Values; Canadian Environmental Quality Guidelines (CCME, 2003) or ORNL Effroymson values (ORNL, 1977).

[e] USEPA Region 10: Joseph Goulet (Eco Risk Assessor) says Region 10 has no recommended hierarchy, therefore, values from the USEPA Region 7 Approach were used.

[f] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel (TAL), 1999, *Nitroaromatic Munition Compounds: Environmental Effects and Screening Values.* **Rev. Environ. Contam. Toxicol.**
Los Alamos National Laboratory (LANL), Eco Risk Database, Release 2.2, September 2005.

[g] Potential bioaccumulative constituents will be evaluated in more detail, as some screening values do not take into account bioaccumulation.
Potential bioaccumulative potential from: *Bioaccumulation and Interpretation for the Purposes of Sediment Quality Assessment: Status and Needs* (USEPA, 2000) and ODEQ EQSLVs (ODEQ, 2001).

[h] Final Screening Value selected using the following hierarchy:
1. State Value (Oregon)
2. USEPA Region State Located In (USEPA Region 10)
3. Lower of Talmage et al. [TAL] (1999) or LANL (2005) values.

AWQC=National Ambient Water Quality Criteria
LANL= Los Alamos National Laboratory
Tier II=Great Lakes Tier II Water Quality Criteria
EPRGs=Oak Ridge National Laboratory Ecological PRGs
TAL=Talmage et al (1999)
CCME=Canadian Council of Ministers of the Environment, Environmental Quality Guidelines

Other References:

Efroymson, R.A., et al., 1997, P*reliminary Remediation Goals* (EPRGs), ORNL, ES/ER/TM-162/R2,
Canadian Environmental Quality Guidelines (for Freshwater) Summary Table, CCME, December 2003.
Great Lakes Tier II Values from Suter, G.W. and C.L. Tsao, 1996, *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Rev* , ES/ER/TM-96/R2.
National AWQC from USEPA Water Quality Criteria Web Site: http://www.epa.gov/waterscience/criteria/wqcriteria.html

Table 8
Selection of Ecological Sediment Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Parameter	ODEQ Screening Level Values [a] (mg/kg) Freshwater	Region 5 Ecological Screening Levels [b] (mg/kg)	EPA Region 7 [c] (mg/kg)		EPA Region 8 [d] (mg/kg)		EPA Region 10 [e] (mg/kg)		Other Ecological Screening Levels [f] (mg/kg)		Potential Bioaccumulative Constituent? [g]	Final Ecological Screening Value Sediment [h] (mg/kg)	Practical Quantitation Limit (mg/kg)
Metals/Inorganics													
Aluminum	NVA	NVA	NVA		NVA		NVA		2.80E+02	LANL		2.80E+02	20.0
Antimony	3.00E+00	NVA	NVA		NVA		NVA		3.60E-01	LANL	Yes	3.00E+00	0.5
Arsenic	4.00E+00	9.79E+00	9.79E+00	MAC	9.79E+00	MAC	9.79E+00	MAC	1.20E+01	LANL	Yes	4.00E+00	0.6
Barium	NVA	NVA	NVA		NVA		NVA		4.80E+01	LANL		4.80E+01	0.5
Beryllium	1.22E+02	NVA	NVA		NVA		NVA		7.30E+01	LANL	Yes	1.22E+02	0.4
Cadmium	3.00E-03	9.90E-01	9.90E-01	MAC	9.90E-01	MAC	9.90E-01	MAC	3.30E-01	LANL	Yes	3.00E-03	0.5
Calcium	NVA	NVA	NVA		NVA		NVA		NVA			NVA	100.0
Chromium	3.70E+01	4.34E+01	4.34E+01	MAC	4.34E+01	MAC	4.34E+01	MAC	5.60E+01	LANL	Yes	3.70E+01	1.0
Cobalt	NVA	5.00E+01	NVA		NVA		NVA		2.30E+02	LANL		2.30E+02	0.5
Copper	1.00E+01	3.16E+01	3.16E+01	MAC	3.16E+01	MAC	3.16E+01	MAC	1.70E+01	LANL	Yes	1.00E+01	1.0
Iron	NVA	NVA	NVA		NVA		NVA		2.00E+01	LANL		2.00E+01	15.0
Lead	3.50E+01	3.58E+01	3.58E+01	MAC	3.58E+01	MAC	3.58E+01	MAC	2.70E+01	LANL	Yes	3.50E+01	1.0
Magnesium	NVA	NVA	NVA		NVA		NVA		NVA			NVA	25.0
Manganese	1.10E+03	NVA	NVA		NVA		NVA		7.20E+02	LANL		1.10E+03	0.5
Mercury	2.00E-01	1.74E-01	1.80E-01	MAC	1.80E-01	MAC	1.80E-01	MAC	1.80E-02	LANL	Yes	2.00E-01	0.06
Molybdenum	NVA	NVA	NVA		NVA		NVA		NVA			NVA	0.5
Nickel	1.80E+01	2.27E+01	2.27E+01	MAC	2.27E+01	MAC	2.27E+01	MAC	3.90E+01	LANL	Yes	1.80E+01	1.0
Perchlorate	NVA	NVA	NVA		NVA		NVA		NVA			NVA	
Phosphorus	NVA	NVA	NVA		NVA		NVA		NVA			NVA	
Potassium	NVA	NVA	NVA		NVA		NVA		NVA			NVA	25.0
Selenium	1.00E-01	NVA	NVA		NVA		NVA		1.00E+00	LANL	Yes	1.00E-01	2.0
Silver	4.50E+00	5.00E-01	1.80E+00	EPRG	1.80E+00	EPRG	1.80E+00	EPRG	1.00E+00	LANL	Yes	4.50E+00	0.3
Sodium	NVA	NVA	NVA		NVA		NVA		NVA			NVA	250.0
Strontium	NVA	NVA	NVA		NVA		NVA		1.70E+03	LANL		1.70E+03	
Thallium	7.00E-01	NVA	NVA		NVA		NVA		4.40E-02	LANL	Yes	7.00E-01	0.5
Titanium	NVA	NVA	NVA		NVA		NVA		9.80E+01	LANL		9.80E+01	
Vanadium	NVA	NVA	NVA		NVA		NVA		3.00E+01	LANL		3.00E+01	15.0
Zinc	3.00E+00	1.21E+02	1.21E+02	MAC	1.21E+02	MAC	1.21E+02	MAC	3.70E+01	LANL	Yes	3.00E+00	2.0
Zirconium	NVA	NVA	NVA		NVA		NVA		NVA			NVA	
PAHs													
1-Methylnaphthalene	NVA	NVA	NVA		NVA		NVA		NVA			0.18 (surrogate)	0.015
2-Methylnaphthalene	NVA	2.02E-02	NVA		2.00E-02	ISQG	NVA		1.80E-01	LANL		1.80E-01	0.015
Acenaphthene	2.90E+02	6.71E-03	8.90E-02	EPRG	6.70E-03	ISQG	8.90E-02	EPRG	6.20E-01	LANL	Yes	2.90E+02	0.015
Acenaphthylene	1.60E+02	5.87E-03	1.30E-01	EPRG	5.87E-03	ISQG	1.30E-01	EPRG	4.40E-02	LANL	Yes	1.60E+02	0.015
Anthracene	5.70E+01	5.72E-02	5.72E-02	MAC	5.72E-02	MAC	5.72E-02	MAC	3.90E-04	LANL	Yes	5.70E+01	0.015
Benzo(a)anthracene	3.20E+01	1.08E-01	1.08E-01	MAC	1.08E-01	MAC	1.08E-01	MAC	1.10E-01	LANL	Yes	3.20E+01	0.015
Benzo(a)pyrene	3.20E+01	1.50E-01	1.50E-01	MAC	1.50E-01	MAC	1.50E-01	MAC	3.50E-01	LANL	Yes	3.20E+01	0.015
Benzo(b)fluoranthene	NVA	1.04E+01	4.00E+00	EPRG	4.00E+00	EPRG	4.00E+00	EPRG	2.40E-01	LANL	Yes	4.00E+00	0.015
Benzo(k)fluoranthene	2.70E+01	2.40E-01	4.00E+00	EPRG	4.00E+00	EPRG	4.00E+00	EPRG	2.40E-01	LANL	Yes	2.70E+01	0.015
Benzo(g,h,i)perylene	3.00E+02	1.70E-01	6.30E+00	EPRG	6.30E+00	EPRG	6.30E+00	EPRG	2.90E-01	LANL	Yes	3.00E+02	0.015
Chrysene	5.70E+01	1.66E-01	1.66E-01	MAC	1.66E-01	MAC	1.66E-01	MAC	5.00E-01	LANL	Yes	5.70E+01	0.015
Dibenz(a,h)anthracene	3.30E+01	3.30E-02	3.30E-02	MAC	3.30E-02	MAC	3.30E-02	MAC	1.50E-02	LANL	Yes	3.30E+01	0.015
Dibenzofuran	5.10E+03	4.49E-01	4.20E-01	EPRG	4.20E-01	EPRG	4.20E-01	EPRG	NVA			5.10E+03	0.015
Fluoranthene	1.11E+02	4.23E-01	4.23E-01	MAC	4.23E-01	MAC	4.23E-01	MAC	2.90E+00	LANL	Yes	1.11E+02	0.015
Fluorene	7.70E+01	7.74E-02	7.74E-02	MAC	7.74E-02	MAC	7.74E-02	MAC	5.40E-01	LANL	Yes	7.70E+01	0.015
Indeno(1,2,3-cd)pyrene	1.70E+01	2.00E-01	8.37E-01	EPRG	8.37E-01	EPRG	8.37E-01	EPRG	7.80E-02	LANL	Yes	1.70E+01	0.015
Naphthalene	1.76E+02	1.76E-01	1.76E-01	MAC	1.76E-01	MAC	1.76E-01	MAC	4.70E-01	LANL		1.76E+02	0.015
Phenanthrene	4.20E+01	2.04E-01	2.04E-01	MAC	2.04E-01	MAC	2.04E-01	MAC	8.50E-01	LANL	Yes	4.20E+01	0.015
Pyrene	5.30E+01	1.95E-01	1.95E-01	MAC	1.95E-01	MAC	1.95E-01	MAC	5.70E-01	LANL	Yes	5.30E+01	0.015

Table 8
Selection of Ecological Sediment Screening Toxicity Values for Constituents of Potential Ecological Concern (Oregon Sites)

Parameter	ODEQ Screening Level Values [a] (mg/kg) Freshwater	Region 5 Ecological Screening Levels[b] (mg/kg)	EPA Region 7 [c] (mg/kg)		EPA Region 8 [d] (mg/kg)		EPA Region 10 [e] (mg/kg)		Other Ecological Screening Levels [f] (mg/kg)		Potential Bioaccumulative Constituent? [g]	Final Ecological Screening Value Sediment [h] (mg/kg)	Practical Quantitation Limit (mg/kg)
Explosives													
RDX	NVA	NVA	NVA		NVA		NVA		1.30E-01	TAL		1.30E-01	0.075
HMX	NVA	NVA	NVA		NVA		NVA		4.70E-02	TAL		4.70E-02	0.050
1,3,5-Trinitrobenzene	NVA	NVA	NVA		NVA		NVA		2.40E-02	TAL		2.40E-02	0.020
1,3-Dinitrobenzene	NVA	8.61E-03	NVA		NVA		NVA		6.70E-02	TAL		6.70E-02	0.020
2,4-Dinitrotoluene	NVA	1.44E-03	NVA		NVA		NVA		2.90E-01	LANL		2.90E-01	0.040
2,6-Dinitrotoluene	NVA	3.98E-03	NVA		NVA		NVA		1.90E+00	LANL		1.90E+00	0.040
2,4,6-TNT	NVA	NVA	NVA		NVA		NVA		9.20E-01	TAL		9.20E-01	0.040
2-Amino-4,6,-Dintrotoluene	NVA	NVA	NVA		NVA		NVA		7.00E+00	LANL		7.00E+00	0.040
4-Amino-2,6,-Dintrotoluene	NVA	NVA	NVA		NVA		NVA		1.90E+00	LANL		1.90E+00	0.040
2-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		5.60E+00	LANL		5.60E+00	0.075
3-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		4.90E+00	LANL		4.90E+00	0.050
4-Nitrotoluene	NVA	NVA	NVA		NVA		NVA		1.00E+01	LANL		1.00E+01	0.040
Nitrobenzene	NVA	1.45E-01	NVA		NVA		NVA		3.20E+01	LANL		3.20E+01	0.020
Nitroglycerin	NVA	NVA	NVA		NVA		NVA		1.70E+03	LANL		1.70E+03	10
Tetryl	NVA	NVA	NVA		NVA		NVA		1.00E+02	LANL		1.00E+02	0.065
PETN	NVA	NVA	NVA		NVA		NVA		1.20E+05	LANL		1.20E+05	0.50

NVA = No Value Available

[a] Oregon Department of Environmental Quality Screening Level Values (December 2001).

[b] Ecological Screening Levels (ESLs), U.S.EPA Region V, August 2003.

[c] USEPA Region 7: Catherine Wooster-Brown (Eco Risk Assessor) recommends the following hierarchy: MacDonald Consensus Values (MacDonald, 2000); ORNL Effroymson values (ORNL, 1977).

[d] USEPA Region 8: Dale Hoff (Eco Risk Assessor) recommends the following hierarchy: MacDonald Consensus Values (MacDonald, 2000); Canadian ISQG values (CCME, 2003) or ORNL Effroymson values (ORNL, 1977).

[e] USEPA Region 10: Joseph Goulet (Eco Risk Assessor) says Region 10 has no recommended hierarchy, therefore, values from the USEPA Region 7 Approach were used.

[f] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel (TAL), 1999, *Nitroaromatic Munition Compounds: Environmental Effects and Screening Values* , **Rev. Environ. Contam. Toxicol**. or Los Alamos National Laboratory (LANL), Eco Risk Database, Release 2.2, September 2005.

[g] Potential bioaccumulative constituents will be evaluated in more detail, as some screening values do not take into account bioaccumulation.

Potential bioaccumulative potential from: B*ioaccumulation and Interpretation for the Purposes of Sediment Quality Assessment: Status and Needs* (USEPA, 2000) and ODEQ EQSLVs (ODEQ, 2001).

[h] Final Screening Value selected using the following hierarchy:
1. State Value (Oregon)
2. USEPA Region State Located In (USEPA Region 10)
3. Lower of Talmage et al. [TAL] (1999) or LANL (2005) values.

Note: The Talmage [TAL] screening values assume 10% organic carbon in the sediment.

MAC=MacDonald Consensus Values
EPRGs=Oak Ridge National Laboratory Ecological PRGs
ISQGs=Canadian Interim Sediment Quality Guidelines
LALN=Los Alamos National Laboratory
TAL=Talmage et al (1999)

Other References:

Efroymson, R.A., et al., 1997, P*reliminary Remediation Goals* (EPRGs), ORNL, ES/ER/TM-162/R2,
Canadian Interim Sediment Quality Guidelines (ISQGs) Summary Table, CCME, December 2003.
MacDonald, D.D, C.G. Ingersoll and T.A. Berger, 2000, *Development and Evaluation of Consensus-Based Sediment Quality Criteria for Freshwater Ecosystems* , Archives of Environmental Contamination and Toxicology 39:20-31.

Draft Worksheets

Site Information Worksheet
MRSPP Data Gaps
HRS Data Gaps

Site Information Worksheet

Site: 21 AOCs

Project: Camp Adair

	Site Information Needed[a]	Suggested Means to Obtain Site Information	Potential Source(s) of Site Information	Responsible for Obtaining	Deadline for Obtaining Site Information
1	Background sampling requirements for metals, explosives, perchlorate	ODEQ protocol	ODEQ guidance document	WDEQ	For inclusion in TPP Memo
2	Background metals data	Sampling	Add more samples to field program	Shaw	For inclusion in TPP Memo
3	Locate MEC at 4 of 5 Small Arms Range AOCs	Site recon/consider use of geophysics	Historical aerial photos/review historical documents	Shaw	For inclusion in Site Specific Work Plan
4	Schedule for sampling AOCs	Consultation	ODEQ	Shaw	Prior to field work
5	Inform landowners of site visits	Phone			Prior to field work
6	Lat/Long and x,y on all maps	GIS	Add to maps	Shaw	For inclusion in TPP Memo
7	Point of contact for community	Not applicable			Before start of field work
8	Access agreements	Letters, call, or visit stakeholders	Letters/conversations with stakeholders	USACE	Before start of field work
9	Threatened or endangered species within AOCs	Phone	U.S. Fish and Wildlife	Shaw	For inclusion in TPP Memo
10	Areas of cultural significance within AOCs	SHPO	Phone SHPO	Shaw	For inclusion in TPP Memo

[a] Refer to EM 200-1-2, Paragraphs 1.1.3 and 2.2.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Infiltration Range No. 143
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation (EHE)	1	Munitions Type	X	Reconnaissance of area		Small arms (.22 to .50 caliber), dynamite, TNT
	2	Source of Hazard			x	Former small arms range
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				60 to 70 EHE Rating D (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Range Complex No. 4
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type	x	Reconnaissance of area		Small arms (.22 to .50 caliber), dynamite, TNT
	2	Source of Hazard			x	Former small arms range
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Range Complex No. 5
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type	x	Reconnaissance of area		Small arms (.22 to .50 caliber)
	2	Source of Hazard			x	Former small arms range
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Range Complex No. 6
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type	x	Reconnaissance of area		Small arms (.22 to .50 caliber)
	2	Source of Hazard			x	Former small arms range
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Skeet Range No. 580
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	Small arms (.22 to .50 caliber)
	2	Source of Hazard			x	Former small arms range
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Range Complex No. 1
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation (EHE)	1	Munitions Type			x	Light and heavy arms (.30 to .50 caliber); 105mm, 155mm howitzers; mortars; 2.35-in anti-tank, practice rockets; 100-, 300-, 500-lb bombs; explosives; blasting caps; incendiary, illumination, smoke devices
	2	Source of Hazard			x	Bombing, gunnery, artillery ranges
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Range Complex No. 2
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation (EHE)	1	Munitions Type			x	Light and heavy arms (.30 to .50 caliber); 105mm, 155mm howitzers; mortars; 2.35-in anti-tank, practice rockets; 100-, 300-, 500-lb bombs; explosives; blasting caps; incendiary, illumination, smoke devices
	2	Source of Hazard			x	Bombing, gunnery, artillery ranges
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Bombing Target No. 1
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	105mm, 155mm, 100-, 500-lb bombs
	2	Source of Hazard			x	Bombing, gunnery, artillery ranges
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Range Complex No. 3
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation (E	1	Munitions Type			x	Small arms, .50 caliber machine gun; 105mm, 155mm, 37mm, 57mm projectiles; 60mm, 81mm mortars
	2	Source of Hazard			x	Gunnery, artillery ranges
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Mortar Range
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	Small arms; 60mm, 81mm mortars
	2	Source of Hazard			x	Mortar, small arms range
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Moving Target Range No. 75
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	75mm projectiles, 37mm projectiles
	2	Source of Hazard			x	Arterillery range
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: East Live Hand Grenade Court
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	Mk II hand grenade, M21 practice hand grenade
	2	Source of Hazard			x	Live hand grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: West Live Hand Grenade Court
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	Mk II hand grenade, M21 practice hand grenade
	2	Source of Hazard			x	Live hand grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Live Hand Grenade Court No. 129
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	Mk II hand grenade, M21 practice hand grenade
	2	Source of Hazard			x	Live hand grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Practice Grenade Court No. 120
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	M21 and Mk 1A1 practice hand grenades
	2	Source of Hazard			x	Practice grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Practice Grenade Court No. 121
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	M21 and Mk 1A1 practice hand grenades
	2	Source of Hazard			x	Practice grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Practice Grenade Court No. 122
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	M21 and Mk 1A1 practice hand grenades
	2	Source of Hazard			x	Practice grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Practice Grenade Court No. 125
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	M21 and Mk 1A1 practice hand grenades
	2	Source of Hazard			x	Practice grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Practice Grenade Court No. 126
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	M21 and Mk 1A1 practice hand grenades
	2	Source of Hazard			x	Practice grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Practice Grenade Court No. 127
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation	1	Munitions Type			x	M21 and Mk 1A1 practice hand grenades
	2	Source of Hazard			x	Practice grenade court
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Munitions Response Site Prioritization Protocol (MRSPP) Data Gaps
32 CRF Part 179

Installation: Camp Adair
AOC: Chemical Identification Area No. 182
RMIS Range ID: F10OR0029

Module	Table No.	Table Description	Data Gap	Potential Source of Information to Fill Data Gap	No Data Gap	Description of Known Data
Explosive Hazard Evaluation (EHE)	1	Munitions Type			x	Tear gas M1; Capsule riot control CS; Chemical ID Set Instructional M1 and Detonation M1; Chemical ID Toxic Gas Set M1; Toxic chemical munitions
	2	Source of Hazard			x	Chemical identification area
	3	Location of Munitions				
	4	Ease of Access				
	5	Status of Property				
	6	Population Density				
	7	Population Near Hazard				
	8	Activities/Structures				
	9	Ecological and/or Cultural Resources				
	10	**EHE Module Score**				< 38 EHE Rating G (Preliminary)
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration			x	Historical evidence indicates that CWM are not present
	12	Sources of CWM			x	Historical evidence indicates that CWM are not present
	13	Location of CWM			x	Historical evidence indicates that CWM are not present
	14	Ease of Access			x	No barrier
	15	Status of Property			x	Non-DoD control
	16	Population Density			x	< 100 persons per square mile
	17	Population Near Hazard			x	0 inhabited structures w/in 2 miles
	18	Activities/Structures			x	Agricultural - livestock grazing
	19	Ecological and/or Cultural Resources			x	Ecological resources present
	20	**CHE Module Score**				< 38 CHE Rating G (Preliminary)
Health Hazard Evaluation (HHE)	21	HHE Factor Levels	x	Contaminant hazard evaluation pending analytical results		
	22	HHE Three-Letter Combination Levels	x	Contaminant hazard evaluation pending analytical results		
	23	HHE Module Ratings	x	Contaminant hazard evaluation pending analytical results		
	24	HHE Module Rating	x	Contaminant hazard evaluation pending analytical results		
MRS Priority	**25**	**MRS Priority (Based on Highest Hazard Evaluation Module Rating)**	**x**	**Evaluation pending filling of data gaps**		

To be completed by USACE once all data gaps are filled.

Camp Adair HRS Data Gaps

Information required to complete the MEC-HRS data collection form:

Item	Number	Comment – Missing Data Element
1	1.8	Confirm the latitude / longitude of potential source(s) and the accuracy of the information (in meters)
2		Source scale (i.e., 1:24,000, etc.)
3	1.12	Site Permits
4	2.4	Confirm if there are other NPL sites within 1 mile of the site
5	5.3	Population within 1 mile, within 4 miles
6	6	Water use (GW within 4 miles, SW within 15 miles)
7	6.1	Total drinking water population served
8	6.2	Type of drinking water supply system (GW or SW?)
9	6.3	Other water uses of GW within 4 miles
10	6.5	Surface water uses
11	6.6	Type of SW adjacent to (within 2 miles) of the site
12	8.1	Types of action(s) that have occurred at or near the site
13	8.2	Who did the action? (EPA, Private parties, other, etc.?)